

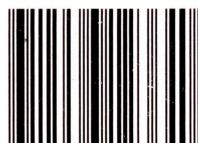
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United Kingdom

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John Fairfax & Sons (Australia) Limited
Associated Press House
12 Norwich Street
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Tel: (01) 353 9321; Fax: (01) 583 0348

**All Subscription Enquiries
to the Subscriptions Manager**
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YOUR COMPUTER

is published monthly by
The Federal Publishing Company,
180 Bourke Rd,
Alexandria 2015 NSW.

Printed by HannanPrint,
140 Bourke Rd, Alexandria 2015.

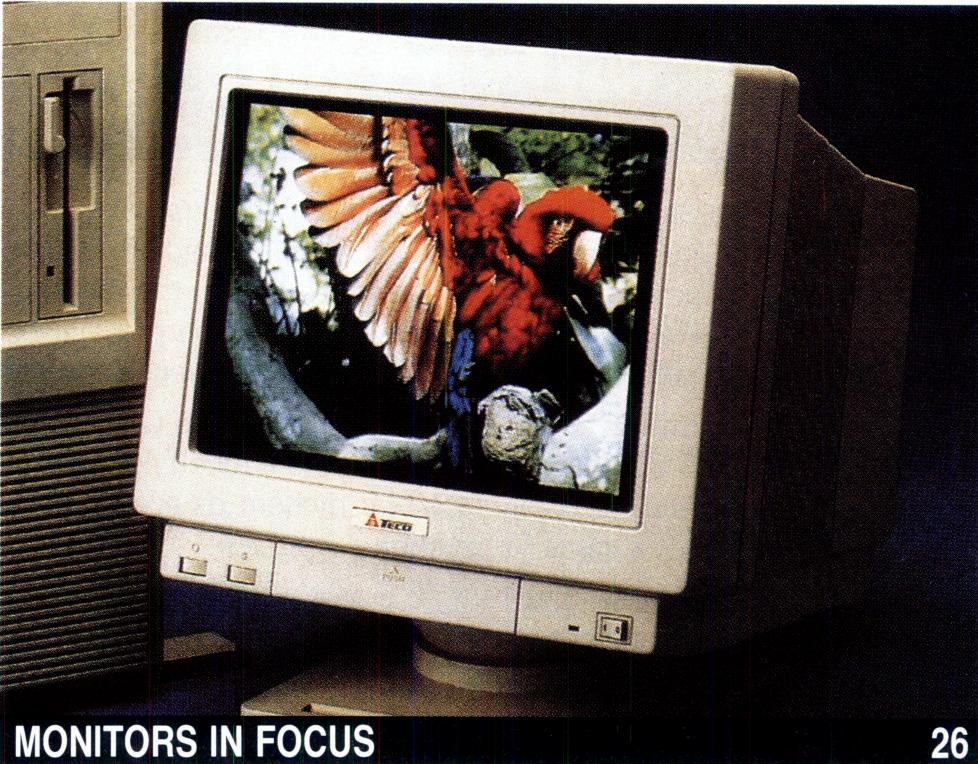
Circulation Manager

Michael Prior

Distributed by
Newsagents Direct
Distribution Pty Ltd.
150 Bourke Road,
Alexandria
(02) 693 9517

Distributed in New Zealand
by Network Distributors Ltd.
67-73 View Road,
Glenfield, Auckland.
Ph: 443 0245. Fax: 443 0249.

*Recommended and maximum price
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ISSN 0725-3931.



MONITORS IN FOCUS

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QUEENSLAND

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NEXT MONTH INCLUDES

OCTOBER IS OUR annual communications feature – and this year we have our best ever. Mark Cheeseman will cover the steps and commonly encountered pitfalls to installing a Novell network in the second part of his networking article. Then, for long-distance communicators, what benefits are there in using the latest offering of V32 (9600bps) modems? (The answer isn't what you might expect.) Our lead story covers all the steps necessary to set up your own communications system and then describes the world-wide selection of services it can be used with. Unfortunately, the second part of 'Computers and the Law' had to be held over this month because of lack of space – but it's ready for October.

This month's cover: Concept and design by Sally Anne Silveira, photography by Peter Beattie, tower courtesy of Syncomp and monitors courtesy of The Great Escape.



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JAKE
KENNEDY

WRITING OUR feature article 'Buying an entry level PC' this month was an interesting exercise – because that is exactly what I was doing. Usually, I find it's easy to write to fit a space, but this month, since the topics was very much on my mind, I had to cut the words short. So, if I've left any questions unanswered, drop a line to 'Write Bytes'.

In the introduction to that article I make the point that an 'entry level' system is simply the most basic system that will efficiently do the tasks expected of it. What we here at *Your Computer* expect from a PC is different from what anyone else would ask; everyone's requirements are different and usually fairly specific. That, of course, is the very reason that we do not, as a rule, recommend particular products – we can only suggest that for a particular problem it offers a solution and let everyone make up their own minds. We use products as examples of price, features and availability; our mentions are not recommendations. (That topic came up earlier this month: see Dianne Gale's letter in 'Write Bytes'.)

So – what did Mark and I decide was an 'entry level' machine for us? Our writing about PCs with a very specific audience in mind, was the first thing we had to take into account. In other words, what type of machine is our audience likely to have or purchase within the next year or so? What configuration will run the high-end PC software that is likely to attract small business users?

Now, in the IBM world, XTs still represent the biggest installed base (and we tend to forget that wordprocessing is still by far the most common application); but

A basic system

September 1983

The most recent figures I could obtain showed that there are 750,000 businesses in Australia with less than 100 employees. These are the very companies that are now buying small computers as prices drop – *Les Bell, Editorial, p6*. The marvelous little TRS-80 Model 100 is small enough to fit in one corner of a briefcase, yet powerful enough to replace a lot of bigger hardware – *'Briefcase Bombshell', p21*.

ATs are catching up fast. For various reasons, though, PC prices are dropping across the range. In the last 12 months, almost every major manufacturer has announced price cuts, or 're-adjustments', across the board here in Australia – IBM, Toshiba, and Hewlett-Packard amongst others. Apple has made the same re-adjustments in its world. That puts the pressure on the competition – and the users win more bang for their bucks.

That gave us half a reason to opt for a '386-based system: we expect that it will

become the most common system over the next several years. The other half of the reason was the software mentioned above: we need to run fairly intensive tasks occasionally. This may be using Corel Draw or dBase as part of our work putting together the magazine or testing the likes of Lotus add-ons or network products.

That settled it and we went for a 33MHz '386. Memory? It was tempting to ask for a full 16Mb, but reason got the better of us and we decided on 4. After all, any software or common combination that can't run in 4Mb of RAM isn't seriously intended for mainstream 'small' businesses. We define those fairly broadly, but it's a group we see with a common set of problems when it comes to PCs: how do I get the most effective use from it? That's what we are here for; like it says on the masthead 'Making your micro work' (I still prefer 'micro' to 'PC', but I guess even jargon dates).

Hard disk? Here we had to hold ourselves in check again – 300Mb was tempting, but we couldn't really justify the \$1000 more it would cost than a 100, which we settled on. We had to be realistic: what did we actually need for our own daily use (40Mb) and what for software evaluation (another 40), and a bit to spare. We felt anything larger than that and we would be wasting the space.

The display systems had to be VGA, and for flexibility, we went NEC MultiSync, the 16-inch 3D, because they would often be used for photography.

There you have it – our 'entry level' system. Mark's in the middle of setting his up and I'll have mine next week. We'll keep you posted. □

Future Features

IN ADDITION to our application stories, news and other informative pieces, each month we present features designed to keep you informed about the world of personal computing –

October 1990

Communications hardware and soft-

ware, networking, and on-line services.

November 1990

Computer graphics and RISC-based machines.

December 1990

Integrated software and accounting packages.

Application stories – particularly those with the same theme as our features – are always welcome. Because of lead times, material must be received at least eight weeks prior to the month of intended publication. Please address editorial enquiries on our features to Mark Cheeseman, (02) 693 4143, and advertising enquiries to Mark Wilde, (02) 693 6646.

AMERICAN GRAFFITI



HOWARD KARTEN

Ain't progress great?

IT'S A little astonishing to think about how far 'entry level' PCs have come in just a bit over a decade. From the really early days in 1979 or so (just about the time of the first PC, a machine called either MITS or Altair), through the 48K Apple II and the early 256K IBM PC, with its single-sided, 160K disks – today's entry level PC looks a heck of a lot different. The logical side of me (I know some doubt that I have one) applauds this development – everyone likes the idea of more bang for the buck, more reliability, more choices and so on. At the same time, the crotchety side of me says, how is this development affecting most users or buyers? Just what on earth are entry level users doing with all that power? It's as if you gave an army tank to someone who only recently mastered the bicycle.

Think about it. Almost from the first time someone booted up Dos 1.0, some folks have complained bitterly about the alleged complexity of Dos – 'all those cryptic commands, and so many choices'. (Some day, some smart scientist will discover why it is that people who are capable of learning the most incredibly arcane stuff, like nouns, verbs, adjectives, adverbs and gerunds – *gerunds*, for pity's sake! – and literally thousands of English words, have so much difficulty coping with about a dozen or so key commands.)

With an early PC, once you got it out of the box, you put a disk in drive A:, and you were off and running. Today's entry level PC is a bit more complex – 40Mb, decisions about color, and when you get it unpacked, the first thing you have to do is figure out what that 'partition your hard disk' stuff is all about. Then you have to figure out about default colors for all your software, and set up batch files (which themselves are vastly more sophisticated than they used to be), and figure out about backups – it's a wonder anyone other than computer jocks ever gets these things.

Yet, clearly, users are able to understand and cope with these things – otherwise, those new computers would be as dramatic a flop as Edsels were. (The Edsel was a 1950's era Ford Motor Company car

that's become a classic marketing case history of failure in introducing a new product.)

Puzzled

SO, HERE'S something that's been puzzling me for some time about these alleged entry level PCs – who on earth is it that's using them? You'll get no argument from me that they are useful – after all, they're useful enough so that some companies are networking them together and replacing mainframes with them. But are they really in the hands of entry level users? Is that possible, given all the complaints in the popular press about how hard computers are to use? And, if so, just what are those entry level users doing with all that power and speed? I mean, if you're mincing words or rerunning the numbers, how much time is a multi-meg, technicolor whizbang machine going to save?

*So, here's something
that's been puzzling me
for some time about these
alleged entry level PCs –
who on earth is it that's
using them? You'll get
no argument from me
that they are useful.*

Networks

NETWORKS ARE a similar phenomenon in a few ways. Don't get me wrong – I think networks of all kinds are great. I'm all for anything that makes life easier.

Are networks difficult to use? Sure, at first. Are they necessary? Well . . . that's a kangaroo of a different color, as we say. Like today's entry level PCs, today's networks are incredibly fast and powerful and

sophisticated. The fastest ones can zip the Encyclopedia Britannica over the lines in about three seconds.

And, the same things are happening with, say, LANs as with computers – the entry level is moving up. The way it used to be was that you installed the LAN, friends used it to coordinate lunches and share dirty jokes, and that was that. Today, the world is smarter, so after you install it, you start *managing* it. You monitor and tweak it, and gather stats, and project trends and usage . . . all in all, a lot more complicated.

There are a couple of things I've never been able to grasp about networks. Not technically – all those stars and rings and buses and things, that's the easy part. The part I've had trouble with is figuring out just what people are doing with them, and how they're an advantage over, say, SneakerNet, and especially how all these fancy kinds of wiring are better than the old standby of simply running wires from the main computer to everyone's terminal or PC.

One company I know is especially proud of its network. It's sophisticated stuff – reaches around the world, lets people work in different places from those powerful entry level PCs. Only one minor problem – it's so small that I almost hesitate to mention it. They're all so busy communicating with each other that they spend the first hour of the day reading their mail. And the next replying. (Really – you think I could make that up?)

In any case, the most efficient network of all, of course, predates the computer by several years. It's the good old grapevine. It's hard to think of a network which distributes information faster, or more effectively!

Every so often, I wonder where this constant raising-the-ante on the entry level is going to lead. I have a hypothesis – the famous application backlog is going to turn into . . . a training backlog! So, I'm off to invest in some computer training companies. I found a neat one – uses all kinds of fancy software and AI stuff to help train people.

As I said earlier: ain't progress great? □

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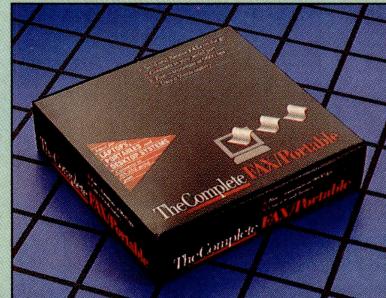
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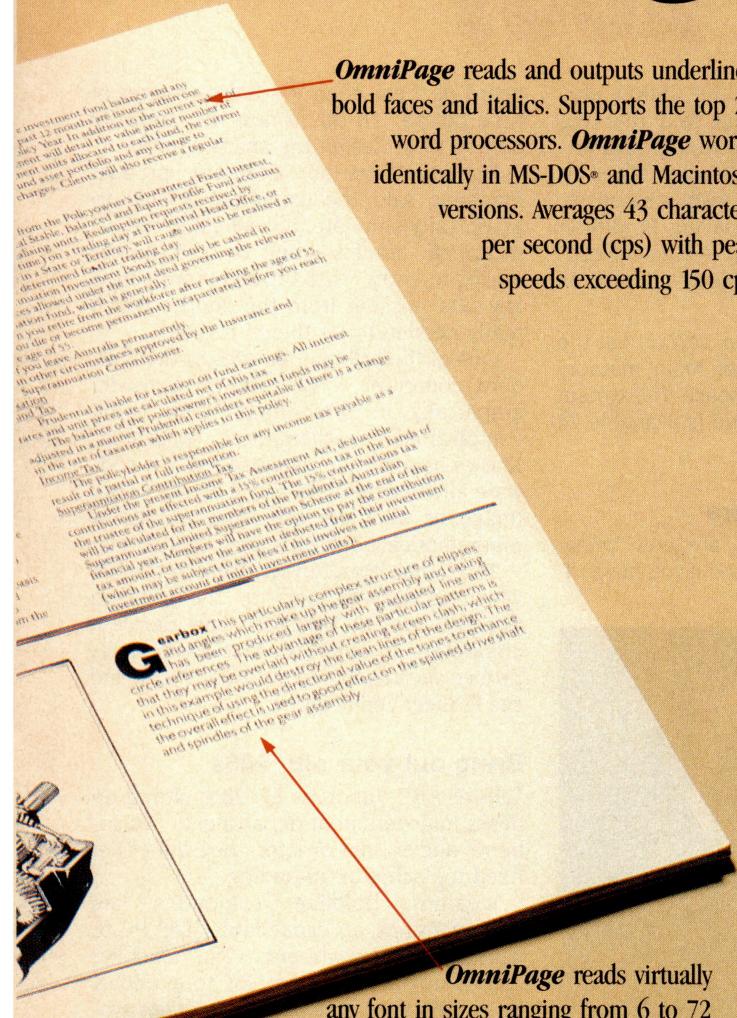
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BILL
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From mainframes to '286s

FUJITSU IS now moving towards being more a service oriented organisation, Neville Roach, chief executive of Fujitsu Australia, said in Canberra recently. Roach was speaking at the opening of the new computer installation at CSIRO headquarters. The CSIRO contract represents Fujitsu's first major success in this line of business.

Fujitsu, which is now developing as a computer service organisation, is able to offer as much or as little support as customers need, Roach added.

Because Fujitsu is now the market leader in PABX, Roach believes the next step for the CSIRO should be advanced networking and communication: 'We need to develop a strong networking infrastructure with CSIRO.'

Dr John Stocker, from the CSIRO, also speaking at the opening, said that the Fujitsu contract was important in supporting CSIRO activities efficiently. 'This allows us to spend more resources on research. We are currently saving 10 million dollars a year through more efficient support, and the Fujitsu project will save us two million dollars.'

Fujitsu is using a Facom M760/10 at the CSIRO site with 32Mb of main memory and 20 gigabytes of disk space. The system will service 1000 users and is available 24 hours a day.

More super-computers

STAR DENT COMPUTERS are now being distributed in Canberra, and if you haven't

heard of them, then it's only a matter of time before you do. In fact, the company helped to re-design the space shuttle.

Romulo Severino, Stardent product manager, said the computer is able to graphically simulate, in real time, the atmospheric forces acting on the shuttle during re-entry. 'NASA found there were a few bits missing from the shuttle which really needed to be there,' he said.

One of the brilliant features of the Stardent computer is the ability to render graphically in three-dimensional color, complicated mathematical problems. Known as scientific visualisation, the software allows scientists to see an on-screen image of what are otherwise strings of mathematical equations and calculations.

The Lunar Planetary Institute in the US, which is located next to the Johnson Space Centre at Houston, uses Stardent computers to analyse data from space probes such as the Viking Mass Probe and the Pioneer Venus probe.

Bring out your old '286s

THERE ARE hundreds of '286s sitting on desks in government departments in Canberra, and sooner or later, they will either need replacing or upgrading.

Wearnes Boldline computers are demonstrating an expandable '286 PC to government departments. The machine can be upgraded from a '286 to a '386SX or an i486 through a built-in upgrade system on the motherboard. The machine, which comes with a 40Mb hard disk and VGA, is relatively new to Australia. Melvyn Shreeve, the local representative, said 100,000 units have been sold world-wide with 1000 so far in Australia. 'We have only recently begun selling the units here, and so far, sales have been encouraging.'

Another useful computer accessory Shreeve is offering to the government is the Data Guard fail safe power supply. And, it works in two ways – firstly, by supplying back-up power to a PC for 15 minutes following a blackout, and secondly, by protecting the computer from high voltage spikes.

One nice feature of the unit is its row of led lights, which automatically illuminate the keyboard during a blackout.



Stardent computers are designed for three-dimensional graphics handling. With a 32MHz RISC/CMOS architecture and a 64-bit bus, each Stardent 3000 (running Unix) can have up to four processors ('computational units'). The system can have up to half a gigabyte of main memory and the graphics system gives users 24-bit true color with 1280 x 1024 resolution.

Computer exports

TWO COMPANIES recently announced expanded export programs under the government's partnerships for development program.

Mainframe manufacturer Amdahl, hopes to have exports of more than \$43 million by the end of 1996. As well as hardware, Amdahl is planning to invest \$9 million in R&D by 1996. Australian software development, particularly for Unix, is specifically mentioned in the Amdahl statement.

Oracle software also has plans for 1996. Senator Button's Industry, Technology and Commerce department has announced that Oracle agreed to a total of \$1.5 billion in exports by 1996 and to spending \$400 million in R&D in Australia (emphasis on Unix products for the Asian region). And, it's hoping to export 20 per cent of its turnover by 1996.

With the federal government busy encouraging foreign computer company export and R&D programs, it was inevitable that some Australian companies should complain.

Chris Howells, managing director of NetComm, recently said the government's

partnership for development plans are simply shelters erected to help foreign companies qualify for Australian government markets. He criticised the government's decision to give \$36 million to the US company Du Pont for a takeover, while in the same week Labtam (an Australian company) went into receivership because its technology export contracts with Russia were slow in being paid and could not be guaranteed by the federal government.

Referring to technology support, he said that of each dollar spent locally, 80 cents comes back to Australia, which means the government can afford to spend four dollars locally for every dollar spent overseas.

Telecom also came in for a serve from Howells when he described it's current one per cent of turnover research budget as a national travesty. He also criticised Telecom's foreign purchasing policies as being against local industry.

Telecom troubles

HAVE YOU received a phone bill lately and wondered about being overcharged for calls, or perhaps the costs for modem calls seemed too high? Relax, because now you can keep a daily tab on your outgoing calls with a Telecom call-meter attached to your phone. However, there are a few tiny problems however - it costs around \$100 to install, and there is a waiting list. If there is a dispute between the reading on your phone meter and the one at the exchange, Telecom ignores yours. So, as the Telecom salesgirl told me, you are better off buying a commercial phone meter from Tandy or Dick Smith and installing it yourself.

With politicians talking about making Australia a clever country with computers and high tech industries, it comes as a bit of a shock to see Telecom wasting its money with all those *Yellow Pages* ads. You see, a third of Australian adults can't read the book well enough to find anything in there - their fingers do the walking, trip, then fall over.

The survey, conducted by Sydney university technology lecturer Rome Wickert, also showed more than half of the adults surveyed couldn't work out a 10 per cent surcharge on a lunch bill (Paul Keating will be pleased). Furthermore, nearly 75 per cent of those surveyed could not understand a newspaper article on a straightforward technological subject. So, the technology writers lament that 'my readers just don't understand me,' may be literally true. □



Greg Batchelor (l), CSIRO information systems manager, Dr John Stocker (m), chief executive of CSIRO, and Neville Roach (r), managing director of Fujitsu Australia, opening a traditional Japanese sake wine barrel at the CSIRO - Fujitsu's first major success in this field.

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Disk Size IBM 5 1/4 IBM 3 1/2

Areas of interest: (Please tick)

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|--|---|
| <input type="checkbox"/> Accounts Receivable | <input type="checkbox"/> Accounts Payable |
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| <input type="checkbox"/> Inventory | <input type="checkbox"/> Payroll |
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INDUSTRY UPDATES



Acer buys Altos

ALTOS COMPUTER Systems, one of the pioneering companies in the computer industry, has been purchased by Taiwan-based Acer Group in a deal valued at US\$94 million or US\$8.35 a share.

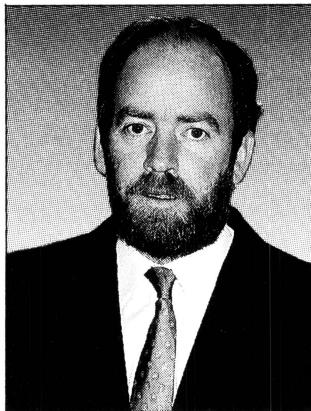
Altos will operate as an independent subsidiary of Acer following the merger, both companies said. Altos' existing products will continue to be marketed and the company will continue to bring new products to the marketplace.

Leonard Liu, president of the Acer Group and chairman and chief executive officer of Acer America, said in prepared remarks that 'Altos provides Acer with complementary channels and a team experienced in delivering and servicing multi-user systems. The addition of Altos' San Jose facility enhances Acer's existing manufacturing capabilities in the United States.'

Founded in 1977, Altos Computer Systems designs, manufactures, and markets Unix-based networked, multiuser computer systems for distribution in 60 countries. Fiscal 1989 sales for the company were US\$140 million, but in its most recent fiscal year, Altos has lost US\$3.1 million on sales of US\$102.6 million. Founder David Jackson, will leave the company following the merger.

The Acer Group, founded in 1976 and based in Taiwan, is a multi-national organisation with more than 5,000 employees worldwide and revenue totaling more than US\$700 million in 1989. Altos is the second Silicon Valley company it has acquired this year. □

Australian Clipper distributor



'Because we use Clipper ourselves, we have a tremendous advantage in supporting the product' – Graham McKechnie, principle of Melbourne-based RCM Software, recently appointed exclusive Australian distributor for Nantucket products.

LOS ANGELES-based Nantucket Corporation has announced that RCM Software of Melbourne is to be the exclusive distributor of Clipper, Nantucket's application development system.

'RCM was an ideal choice for us. The RCM company principals, Graham McKechnie and Ron Polak understand our users' needs. We consolidated our distribution in Australia because most distributors there cannot offer the technical support Clipper users require,' said Larry Heimendinger, president and chief operating officer of Nantucket.

RCM will offer technical sup-

port for Clipper within Australia, as well as establish the Nantucket Australian Authorised Reseller Network. In the past, Nantucket's direct in-

vovement in the Australian market has included visiting user groups and the holding of its first Clipper Developer's Conference in May this year. □

World's fastest general purpose computer

HOT ON the heels of Hitachi, leading Japanese computer maker NEC has announced a general purpose computer which it claims to be the world's fastest.

The new machine, dubbed Acos System 3800 series, was developed based on advanced technologies: ultra high speed logic circuit LSI (large scale integration), ultra high speed bipolar RAM (random access memory), and ultra high density packaging on a multi-layer board. All the technologies were developed for its world's fastest supercomputer SX-3.

The 3800 series comes in seven models ranging from a single processor version to six tightly coupled central processing units. Its processing ability, compared with predecessor Acos 1500, is 2.7 times faster with a single processor and 3.8 times faster with the largest configuration of processors.

The machine employs one gigabyte of main memory expandable to eight gigabytes and the newly developed architecture, called Extended System Architecture or XSA, creates up to 128 terabytes of space for data.

Now, two Japanese leading computer makers, Hitachi and NEC, have announced new machines before IBM, which is expected to release a new machine this year. □

Bechtold receiving donations

ALAN BECHTOLD, president of the US-based BBS Press Service, has announced that donations have begun to come to his office in response to his statement in May that if properly funded, he would launch a non-profit organisation, Modem User's Association of America (MUAA), to conduct legal and lobbying activities on behalf of modem users.

The group, if formed, will also serve as a clearing house of information for users and operators of computer bulletin board systems (BBSs).

Bechtold told Newsbytes that particular interest to date has come from those in states such as Texas and Indiana where the telephone companies have attempted to implement rate structures containing higher rates for users of modems. Bechtold also said that the confusion concerning the liability of system operators brought on by recent legal actions suggest that the bulletin

board community should have a 'self-defined set of guidelines or code of ethics for bulletin board operations'.

He added, 'We have a rapidly growing industry with no trade organisation. I think that I can be helpful in setting one up because of my experience and contacts.' He pledges to make the organisation a success, but if there is no support, 'I will tear up all the cheques that I have received and continue on with other activities'.

Bechtold has set the end of September as a decision point. If, at that time, he has received over \$10,000 in subscriptions, he plans to proceed with the organisation. He has proposed annual membership fees of \$15 for individuals, \$25 for hobby bulletin boards, \$50 for commercial BBSs, \$100 for commercial online services such as GEnie, America Online and CompuServe, \$200 for publishers of communications software and \$500 for modem and hardware manufacturers. Bechtold said that an unnamed Washington DC group has offered to contribute legal and lobbying support for the first year. □

Government steps up security checks

AUSTRALIAN federal government agencies are increasing security levels following revelations that computer abuse has risen sharply in the last year. Some estimates place the total level of fraud against the government at more than US\$3 billion last year.

As is the case in most parts of the world, computer fraud is often unreported and handled internally. This is often due to embarrassment, fear of clients becoming uneasy, or simply arrogance, according to security advisers. Just why the Australian government is loathed to release details is unclear.

Increasingly, government agencies are bringing in external consultants and auditors to give the all-clear to new systems. As one consultant told Newsbytes, 'We went in to check out their new personnel system and found a number of scams including ghosts on the payroll, cheques being raised to fake accounts and personal orders being made on departmental accounts'. The consultant would not name the agency involved. □

Unix battle lines drawn

LEADING workstation maker, US-based Sun Microsystems, has released a report which claims that major software developers are applying Open Look, a GUI (graphical user interface) developed by UI (Unix International), an alliance led by AT&T and Sun, to develop Unix software for the financial industry.

'We cannot deny it if you say we are conscious of rival OSF (Open Software Foundation) with the release,' said Kazuyoshi Manabe, marketing and communications assistant manager of Nihon Sun Microsystems.

In contrast to the US, OSF is to many observers, gaining ground faster than UI here. Hitachi, one of the leading members of OSF, has developed a Japanese version of OSF/Motif, a GUI developed by OSF. Hitachi says its workstations, general purpose computers,

IBM rewrites history

WE THOUGHT that things had changed at IBM. Organisational changes and the announced commitment to working with industry organisations and other firms in the search for open standards gave off signals that the long term 'if it didn't happen here, it didn't happen' mentality was a thing of the past. Sadly, it appears that we were partially wrong.

To put the mentality in some perspective, let's go back a few years to a speech that Bill Lowe, at that time, the person responsible for IBM's personal computer line, gave to a group of corporation presidents at a seminar sponsored by the Conference Board. Lowe managed to talk for 45 minutes on the history of personal computing without mentioning a company *other than IBM*. No mention of Altair, Apple, Commodore or Radio Shack! No mention of any product not made by IBM – therefore, no mention of VisiCalc, the software product that most credit with being responsible for the proliferation of personal computers.

Instead, the group was told about such abominations as the IBM 5100 desktop series that preceded the introduction of the PC. If ever a story was told without benefit of understanding, this was it. Lowe then went on to speak of the amazing breadth of applications software available for the IBM PC and, once again, only referred to products made or marketed at that time by IBM – a collection of products regarded by most in the industry as inferior. No mention of Lotus' 1-2-3, the best-selling software product in the history of the world and the one product that virtually carried the PC to offices throughout the country.

That speech was a number of years ago and we thought that, with all of the reorganisations (Lowe is no longer with the firm), IBM's talk of 'business partners' and 'open systems' and so forth, that this rather stilted outlook of the world had changed. It seems that we were overly optimistic. We were brought back to reality at the introduction of the PS/1 to the US market.

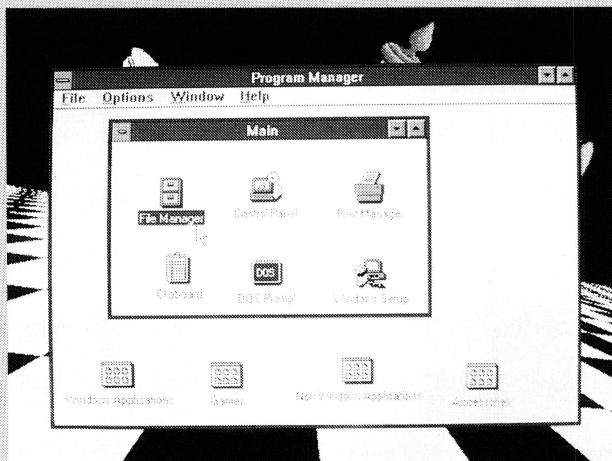
We didn't pick right up on it when we heard a presenter say, referring to the screen presentation, 'We call this the desktop metaphor' – but it became painfully clear when we listened to the tale of how much IBM had listened to users in designing the new system. We were told that 'a woman in a focus group' had told them that she didn't like the terms 'directories' and 'sub-directories'. She, instead, liked to think of her information as though it were contained in a desk drawer. In the drawer, it is sub-divided into folders and she liked the term folders rather than directories. IBM thought that her feeling made a lot of sense so, on the PS/1, collections of data or programs would be shown as folders.

Come on! This scenario sounds like something out of the *Twilight Zone*! Apple started to call things 'folders' about six years ago on the Lisa.

It's obvious that there is no desire to attribute anything innovative to Apple, but our intelligence should not be insulted with stories about women in focus groups anymore than it should have been when we were told that EasyWriter and IBM Time Manager were the programs that sold the original PC.

– Barbara McMullen & John McMullen.

Microsoft committed to Asia



IN A WIDE-ranging exclusive interview with Newsbytes, Steven Husband, Asia Pacific business development manager for Microsoft, stressed his company's commitment to the Asian region and its distributors there. Husband, who was on a tour of the region to review Microsoft's operations, said there were various options for the establishment of new offices in Asian countries. 'It is essential to provide the best possible service to our customers, so we are constantly looking at ways to achieve this. At the same time, we are very loyal to our local distributors. We never take business away from them. Our aim is to establish a nearby presence that will give them the support they need in supporting us.'

Newsbytes raised the subject of many American companies' failure to realise that marketing methods that work well in the US are often inappropriate, and even counter-productive, elsewhere.

'We recognise that problem,' said Husband. 'However, we are fortunate that many of our top people were either raised outside the US, or have traveled extensively and thus have a global outlook. We try to adapt our methods to suit local marketing needs. We have seen some US companies that have not adapted and met with failure. The US may be a big market, but there is a far bigger market outside. That market is of the utmost importance to Microsoft. Overseas sales account for more than 50 per cent of our business and the figure is growing.'

Husband also pointed to the wide range of languages in which Microsoft's products are available. 'This in itself is an indication of the importance we place on the global market. But it takes a great deal of careful forethought. For example, a product design and marketing approach that may be right for Hong Kong, Singapore or Taiwan may not be right for China, although they are all Chinese-speaking territories. It may take us a little longer to get the final product on the

market, but attention to this sort of detail pays off in the long term.'

Husband also revealed that in the US alone, 25,000 copies of Windows 3 were prepared for sale, with a further 5000 in reserve if needed. In the event, the total of 30,000 was not enough - 150,000 were sold in the first two days. 'It was amazing,' said Husband. 'In some places people were lining up around the block to be sure of getting a copy. The initial stock sold out immediately and the reserve went just as quickly, leaving us with a lot of back-orders to fill as fast as we produce the copies.'

In Australia, Windows 3 has broken software sales records by selling the first Australian shipment of 4500 in two days. Enthusiasm for the product has continued past the early stages of release, with the next shipment of 2000 sold before it arrived and orders are still arriving.

Although nowhere near as many packages are being sold as in the US, Microsoft's local Windows product manager, Leighton Jenkins, said that 'the level of market acceptance exceeded our wildest expectations'. While Microsoft is organising weekend shifts in its Seattle plant until back orders are met, it is also promoting licensing agreements whereby hardware suppliers bundle Windows with their machines. Already, Epson has arranged to do so, and, according to Jenkins, are 'negotiating similar agreements with several other suppliers'. When Husband was asked about Microsoft's software in general, he said the company adopts a positive attitude to competition. 'Of course, we would like to have it all, but competition is a fact of life and we aim to make our products as universal as possible so that they will work with packages from our competitors, rather than against them.' He used the example of file and data structures. It is to the user's advantage for one program from one company to be able to read and write data in another company's format. Companies who insist on going entirely their own way, end up out on a limb.

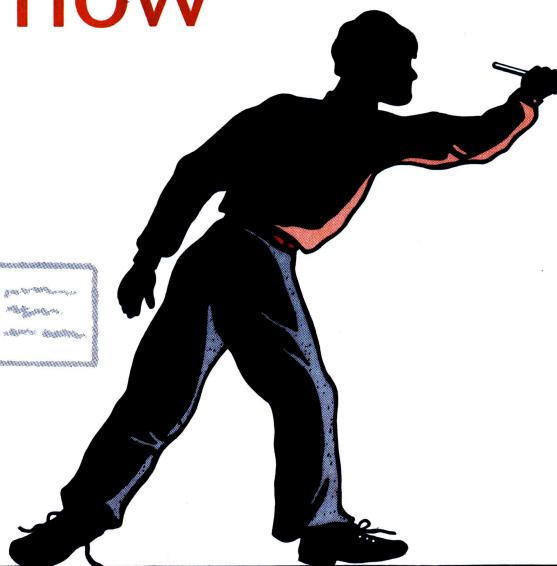
'We have tried to make Windows 3 as complete as possible,' Husband said. 'For example, when you 'press a button' on the screen, the button is actually seen to go in and then come out again. Some might say that is frivolous, but it's fun and is just one of many small details aimed at making the software friendly. At the other extreme, you are not locked into the icon system - you can still call up a command line for the more traditional method of control. This way, we give people the extra flexibility many need. The average executive may never need the command line, but his system manager will find it invaluable when conducting maintenance.'

The advantages of the latest version of Windows are not restricted to users of high-end PCs, either. 'There are still a lot of XT's in use out there and many of them will not be retired for some time to come. Windows 3 works with them, too.'

and supercomputers will have the same interface. NEC, one of the members of UI, also announced a Unix workstation with the latest OS (operating system) Unix SVR 4.0 (System V Release 4.0), but its interface was OSF/Motif. Sony also announced adoption of the GUI for its machines.

Manabe, however, said, 'Unix International already developed the OS, Unix SVR 4.0 and Open Look comes standard with our systems. On the contrary, OSF is not developing its OS, OSF/1, yet.' AT&T and Sun intend to take the lead over OSF with this opportunity.

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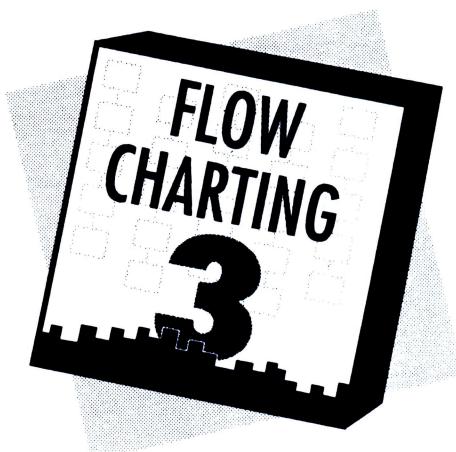
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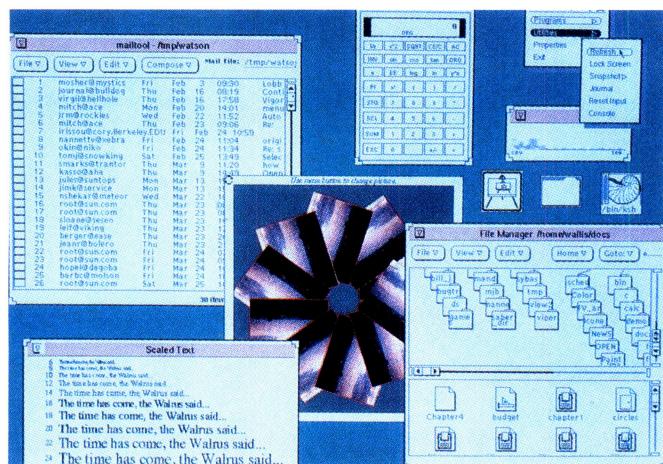
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Leading US workstation manufacturer Sun Microsystems is developing a toolkit with the Open Look interface to encourage developers to write applications for DEC, IBM and HP's Unix workstations, and US-based TGV is developing the kit for DEC's VAX/VMS environment.

The report says Sun is developing a toolkit with the Open Look interface which will help developers write applications for DEC, IBM and HP's Unix workstations. Meanwhile, US-based software house TGV, is also developing the kit for DEC's VAX/VMS environment.

Generally, the Alto, a machine developed by Xerox PARC (Palo Alto Research Centre) is considered the first workstation. The features of a workstation have been defined by TSSes (time sharing systems) based on the Unix environment, network environment, and bit-map displays. Apollo Computer, acquired by HP last year, developed the Domain 'super personal computer' in 1980, a time at which the term workstation did not exist. The computer was the Distributed Operating Multi-Access Interactive Network Machine.

Sun Microsystems was established to put a Sun (Stanford University Network) workstation developed by Stanford and California University Berkeley on the commercial track in February, 1982. The Sun machine at that time was equipped with a 68010 Motorola microprocessor and Unix 4.2 BSD version. The processor was replaced with a SPARC-RISC (scalable processor architecture-reduced instruction set computer) processor with the release of the Sun 3. The RISC processor is a vast improvement in the workstation's cost-to-performance ratio.

Workstations range from upper-end personal computers which employ Motorola 680x0 or Intel 80x86 processors to low-end minicomputers. The major markets for the workstations are design automation and manufacturing, and software engineering which is responsible for over 70 per cent of the total shipments of the machines, according to the Sun's annual report in 1988. On the other hand, the financial market buys six per cent of the workstation product and is seen as a major market to be exploited by workstation makers in the very near future.

Meanwhile, workstation makers are struggling for standardisation of Unix OS and a GUI. This power struggle is generally seen as



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a battle between computer giant IBM and communication giant AT&T, but from the workstation makers' point of view, it is a power struggle for market expansion. Originally, DEC and HP allied in January 1988 against an alliance of Sun and AT&T. IBM joined in May the same year and OSF was founded formally.

Major workstation makers, such as Sun, HP and DEC, claim to have achieved standardisation of Unix OS, however, these firms have their own Unix OS and GUI – HP has HP-UX, DEC has Ultrix, and HP developed its own GUI based on OSF/Motif, NewWave, and DEC developed its own GUI based on X-Windows, DECwindows.

Further progress on the standardisation of the Unix OS and GUI is not getting any easier with the expansion of the workstation market. □

Lotus 1-2-3 for Unix



Lotus Development Corp has announced details of 1-2-3 for Unix – and certification for AT&T and Interactive Unix is expected shortly.

LOTUS DEVELOPMENT has released pricing, availability and support details for 1-2-3 for Unix System V.

Lotus 1-2-3 for Unix System V will be available in two editions, single-user and multiuser. Pricing for the software for single-user is \$1195, for multiuser (to be installed on a '386 PC server) \$2950. Extra sets of user documentation can be purchased for a \$125 handling fee. The package is expected to be available late this year, certified for SCO Unix and Xenix.

Support for the package will be provided by Lotus, with users receiving 90 day's free support from the date of purchase. Additional support can be purchased through Lotus' annual support plan, which includes telephone support and upgrades for 12 months, for a cost of \$350 per annum for the single user version. □

Stock Exchange monitors transactions with AI

THE SYDNEY Stock Exchange has developed a PC-based security system which checks all transactions against prior activity and accepted business practice. Irregularities are flagged and passed to human analysts.

A spokesperson told Newsbytes that the system threshold is set to the point where it reports between 100 and 200 exceptions per day, though the threshold will be increased as the system proves itself. The entire project has been developed in real-time, with the developers working alongside analysts, revising the system almost daily.

The basic system uses state-of-the-art statistical and analytical modelling theories and has so far exceeded all expectations. It has also become apparent that new trading strategies are being developed all the time, so the software constantly needs to learn these. □

PCs hit rock-bottom

PCS, WHICH have held high prices in Europe over the last few years, are now starting to reach all-time rock bottom prices.

DTK's XT system with a 14 inch dual frequency monitor, an 8088-based turbo motherboard in a slim case, 640K of memory, single Chinon 360K floppy drive, Cherry keyboard, serial, parallel, game port, clock and Hercules/CGA and floppy controller currently sells for \$890 in Brussels. A typical AT system with a 20Mb, 28ms hard disk, 12MHz speed rating and 1Mb of memory sells for \$1640.

An even cheaper system starting point is with Ital-Tronix, a low-end specialty system supplier, which is currently offering a 12MHz, PC system, with 640K of memory, single floppy and various interfaces, for \$575. The 20Mb hard disk version sells for \$950.

Even high-end systems are showing signs that prices are coming down. DTK's latest 25MHz '386-based system with a 42Mb, 24ms hard disk and 1Mb of memory sells for \$3200.

A spokesperson from Mastermatch NV, a PC supplier in Belgium and The Netherlands, said: 'The PC is becoming such a commodity now in Europe, that quantities have reached all time highs with corresponding decreases in prices. We expect the prices to stabilise at these levels.'

As with the US market, companies who are still surviving in the European market, will have to offer better quality than price, in order to succeed. □

Computer bounty will continue

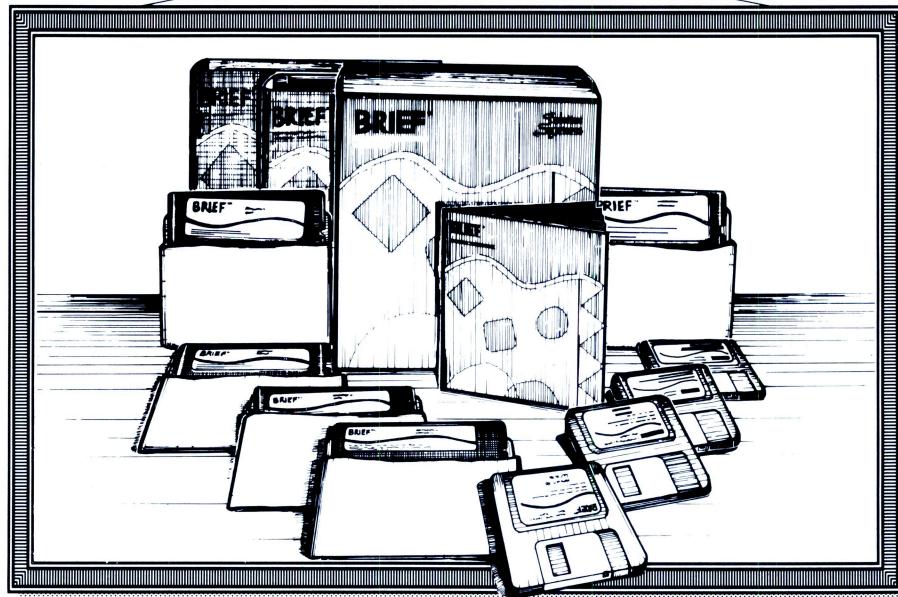
THE AUSTRALIAN Government has announced that the bounty on Australian-manufactured computer equipment will continue until 1995. During the remaining time of the scheme, the bounty will be decreased in line with the government's policy to reduce tariffs in general.

While the Australian Information Industry Association (AIIA) has welcomed the announcement, manufacturers of robotic equipment have pointed out that the bounty has been unable to sustain or encourage manufacture.

Supporters for the continuation of the bounty included the Australian Computer Equipment Manufacturers' Association (ACEMA), the Department of Industry, Technology and Commerce and the Bureau of Industry Economics (BIE), who performed the study recommending continuation. The bounty will be reduced from 20 per cent to 17 per cent in July, and by 1994 will have been reduced to nine per cent. □

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"BRIEF is one of the few pieces of software which I would dare call a Masterpiece."
Timothy Lykes, Programmer



BRIEF is a program editor specifically designed to make programmers more productive. It reduces the tedious tasks a programmer is forced to do with a word processor, while offering a wide array of powerful functions not found in other programs of its kind.

BRIEF is the editor of choice for over 35,000 of the world's professional programmers.

BRIEF is the only editor that has an undo capability that allows you to undo up to 300 commands that affect the cursor or text, including global changes. It also has a menu-driven Setup program that makes installing and performing basic customisation simple.

BRIEF goes beyond the notion of 'wildcards' by providing full UNIX-style regular expressions for search and replace.

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BRIEF features a detailed on-line help system. You also have complete control over your files, buffer windows, and the keyboard. It has easy to remember key assignments with keyboard enhancing functions like ProKey, built right in. It also has conditionals, looping procedures, recursion, local and global variables, and several data types, depending on your video display.

BRIEF supports up to 127 lines and 255 columns. It also takes advantage of a wide variety of colours on screen for easy readability.

BRIEF marks text by column, line, stream, and include or exclude the cursor. In one keystroke, you can copy, or mark the current line. And can easily cut and paste from one window to another. You can even search, translate, print, delete, write or indent a marked area.

BRIEF's safety features allow for automatic file saving when keyboard is idle and creation of backup files as a default.

BRIEF can be used as an editor for over 40 program compilers and can automatically position the cursor at every syntax error. Even if you don't have one of the listed compilers below your program can be added with the menu driven Setup program in 30 minutes.

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Microsoft Quick C	Watcom C	Zortech C
C++	Advantage C++	Guidelines C++
Zortech C++	COBOL	mbp Visual COBOL
Micro Focus COBOL	Microsoft COBOL	Realia COBOL
Ryan-McFarland COBOL	dBase	dBFast
FORTRAN	Lahey FORTRAN	Microsoft FORTRAN
Logitech Modula-2	Modula-2	SLR Optasm
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EDITED BY MARK CHEESEMAN

Monochrome card update

In 'Tech Tips' in the July issue, on the subject of dual mode cards, we mentioned a card which allows both Hercules and CGA modes to operate on a standard monochrome TTL screen, but were not sure of the supplier. One of our readers – Linda McGarry of Kentucky, NSW – tells us that the card is available from Electronic Solutions, PO Box 426, Gladesville 2111 NSW, and is called the Magic Combo Mono/Color Graphics Card. Thanks for the info, Linda.

Metric rulers in Corel

I've been using Corel Draw for technical illustrations – it's the best drawing package I've seen for a PC. While I think I've mastered the package fairly thoroughly, I have never been able to figure out how to change the ruler from inches to centimetres. Because of the type of drawing I do, it hasn't bothered

me (I just use the page size for reference), but a colleague asked me the other day. So, how do I change it?

**George Capon
Parkes, NSW**

Believe it or not, it's in the manual (at least it is in the version we have here – 1.21), not logically indexed, perhaps, but it's there. Under Show Rulers, it explains that the measurements in the ruler display are determined by the set of the grid size – change the grid to 10 divisions per centimetre, or whatever you want, and that's it.

Voice coil drives

I own an AT clone which includes a voice coil hard disk. I opted for this type of drive because of the extra speed over the stepper motor type. However, some people have told me that they are better than stepper motor drives because they automatically park the heads between read/write operations and when the power is turned off. Is this correct, and are there any other advantages of voice coil drives over steppers?

**Nick Trent
Ilford, NSW**

The reason that most voice coil drives can automatically park their heads while stepper motor drives cannot, is related to the mechanical operation of the head actuators in the two types of drives. In the latter, the heads are moved across the disk surface one track at a time by a 'stepper motor', which is so designed that, when pulses are applied to its terminals in the correct sequence, the shaft of the motor rotates a pre-determined amount. So, for the heads in the drive to move inward four tracks, four pulses are applied to the motor; each pulse stepping the head inward one track. Because the amount through which the stepper motor moves when pulsed is known, the position of the heads can be determined by simply adding the steps applied to the motor in the inward direction, and subtracting the steps applied in the other direction.

A voice coil motor, on the other hand, is a type of linear motor, not unlike the voice coil in a loudspeaker – hence the name. This type of drive is an analog system – it is theoretically possible to move the heads from track zero to the innermost track of the drive in a single action, rather than a large number of discrete steps.

Thus, in a voice coil drive, it is a relatively simple matter to include a circuit which detects an oncoming power loss, and moves the heads to their landing zone before the power fails entirely. The power rails from the power supply take a finite time to collapse, thanks to the charge stored in the capacitors in the power supply – more than enough to move the heads of a disk drive to their landing zone.

However, such drives do not usually park the heads between read and write operations – to do so would seriously degrade the access time of the drive. The exception to this is the drives used in some laptops, which park the heads after a predetermined period of inactivity, to protect them against the occasional jolt that is part and parcel of a laptop's lot. Some machines even power the drive down after 30 seconds or so, to save power, so of course, the heads are parked then.

You can get auto-parking utilities for stepper motor drives, so that if the power fails before you parked the heads, there is a good chance that they will already have been parked, provided you haven't used the hard disk recently. For a voice coil drive, there probably isn't any point.

TIFFs ain't TIFFs

Daniel Ford, from Advanced Solutions, was prompted to prepare this technical note about TIFF files when he found that the files produced by his FaxScan software (reviewed in our 'Add-on Atlas' in June) were not compatible with certain software products which can import TIFF files. It seems some TIFF implementations comply with the standard to read some TIFF files, but don't go all the way.

This note was originally prepared by Advanced Solutions for the benefit of FaxScan users. It aims to help prevent them from getting their fingers burned buying graphics software which doesn't work with FaxScan's TIFF files. However, the problem is not restricted to this program alone, so take care when you see the words 'TIFF compatible'.

TIFF is an acronym for Tagged Image File Format. It is a graphics file format administered jointly by Aldus and Microsoft, and used widely in both MS-Dos and Macintosh environments. Although not always apparent to users, TIFF files do not conform to a single, rigid 'format' (layout), but are allowed considerable flexibility by the TIFF specification.

The current TIFF specification (TIFF5) attempts to channel some of this flexibility into more restrictive paths, to simplify the jobs of TIFF 'writers' and 'readers' (that is, programs which write or read TIFF files). It does this by defining four TIFF classes (more may be added in some future revision).

They are class B, for bilevel (1-bit) images, class G, for grey scale images, class P for palette color images, and class R for RGB full color images. For brevity, these classes are usually referred to as TIFF B, TIFF G, TIFF P, and TIFF R. FaxScan writes only TIFF B images, so our discussion henceforth concentrates on that class.

A TIFF B file consists of four types of data – a header, an image file directory (IFD), value fields, and the actual image (pixel) data. The header, which is a fixed length of eight bytes, is always located at the beginning of the file. It simply identifies the file as a TIFF file, notes the byte order in which the data are stored, and contains the offset (location within the file) of the IFD. The IFD contains several 'tags' (from whence the name), which provides information about the type, size and resolution of the image contained in the file, as well as where the image data can be found. The tags are all of fixed length (12 bytes), and so sometimes the information they provide cannot be contained within the 12-byte tag itself. In this case, the tag data points to a Value Field, where the required information is found.

The actual image data (pixel information) is stored in image 'strips'. It is allowable, though not recommended, for an entire (large) image to be stored in a single strip. The TIFF5 specification recommends that the strip size (number of scan lines per strip) be chosen such that each strip occupies about 8K of storage, to make it easier to buffer the image data.

The image data within the strips may be stored uncompressed or compressed. And, if it is compressed, it may be done so by one of two different schemes (there is, of course, a tag which specifies the compression method). The compression method recommended by the TIFF5 specification is called PackBits, a simple, byte-oriented, run-length encoding scheme. The other method is Modified Huffman (MH) Coding, a complex, variable-length, bit-oriented, run-length coding scheme, similar to that used in CCITT Group 3 facsimile machines.

It is not a requirement of the TIFF specification that all TIFF B readers be able to

read compressed files, though this is recommended. Many applications will refuse to read compressed TIFF files, which is a shame, because significant disk space savings can be obtained using one of the compressed formats (depending on the image content, file sizes as small as 10 or 20 per cent of the uncompressed size can be achieved).

One central requirement of the TIFF specification is that, apart from the 8-byte header at the start of the file, all other information can be stored in any sequence anywhere within the file. A pointer (file offset) in the header points to the IFD, pointers in the IFD point to Value Fields, and pointers in the Value Fields (or sometimes in the IFD) point to the image data.

Many (including well-known) application programs, claiming to read TIFF files, ignore this most basic requirement of the TIFF specification, and assume that the various file sections will be in some specific order. These programs are noted in the Compliance Table below with an 'x' in the 'does not comply' column. Some of these, though, will read FaxScan's TIFF files, simply because we happen to have stored our TIFF data in the sequence they expect it. But, they cannot be relied upon to import TIFF files from a variety of other applications, where the data might be (quite legitimately) stored in some different sequence.

FaxScan's TIFF files conform to the TIFF4 specification, simply because so many useful application programs have not yet caught up with the current (TIFF5) specification (many more are still at pre-TIFF4 stages of development). The TIFF4 standard was around for over a year prior to TIFF5, so there is no excuse for ap-

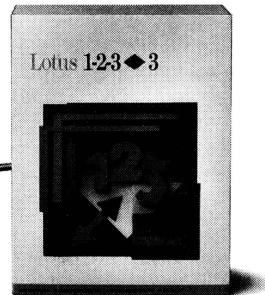
plications not conforming at least to that standard, especially considering that the TIFF specification is available free (to software developers) from Aldus or Microsoft.

The table below was derived from testing each of the named programs with a set of files conforming to the TIFF4 and TIFF5 standards, and with different arrangements (sequences) of the various data components. One other factor which might affect an application's ability to handle your TIFF files, and which does not appear in the Compliance Table, is the question of image size. Whether a TIFF file is compressed or uncompressed, it must ultimately be uncompressed by the application in order to display and manipulate the image. Bitmap (for example, TIFF) images can be quite large in terms of the number of pixels. At a scanning resolution of approximately 200 x 200dpi (dots per inch), as recommended with FaxScan, an A4 page occupies almost 480K of memory, while at 200 x 400dpi an A4 page is about 960K! This exceeds the 'conventional' memory size of MS-Dos PCs, and even the 480K file cannot be entirely fitted in conventional memory if the application program and Dos.

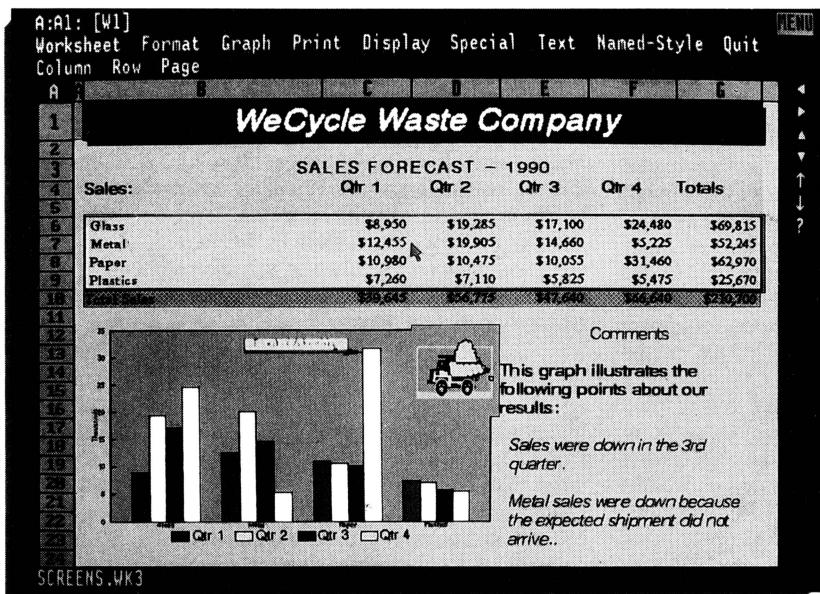
Obviously, EMS is desirable, together with an application which knows how to use it, or else some clever programming tricks are needed to overcome the memory limitation. Designer, Optiks, PageMaker, and Ventura all handle large bitmaps (with EMS), while SLED performs trickery, using the hard disk for 'virtual memory'. Carets/Deluxe handles a 480K page, though it is not known whether it requires EMS to do this. Designer, the Image-In suite, and PageMaker all require Microsoft Windows to run.

Applic. Type	Application	complies TIFF5	complies TIFF4	doesn't comply	reads FaxScan
Design	Designer (Micrografx)	✓	✓		✓
DTP	Pagemaker (Aldus) Ventura Publisher (Xerox)	✓ ✓	✓ ✓		✓ ✓
OCR	Carets/By Hand Deluxe CAT Reader (Comp. Aided Tech) Image-Read (Image-In) Prodigy OCR ReadRight OCR (OCR Systems) Spot OCR (Flagstaff Eng'g)		✓	X X X X X	✓ ✓
Paint (Pixel editors)	Astral Picture Publisher Gray-FX (Xerox) Image-Scan/Paint (Image-In) PaintShow (Logitech) PC Paintbrush IV for Windows PC Paintbrush IV Plus (Zsoft) SLED (VS Software)		✓	X X X X X	✓ ✓ ✓ ✓ ✓
Utility	Hijaak (INSET Systems) Optiks (Graham Systems)	✓	✓	X	✓

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Recommendations

IF YOU don't already have all the applications you need, what should you buy? The first thing to note is that we were only interested in testing the listed programs for TIFF (import) compatibility, to help users avoid obviously inappropriate choices. We did not endeavor to check other features of the programs, as this sort of subjective evaluation would naturally depend on what features a particular user desired.

The second point is that we were primarily interested in testing 'paint' and OCR programs, since a paint program may be required to 'touch up' images prior to using in a DTP application, and OCR is an application of great interest to users of FaxScan. Designer just happens to be in the list because we own a copy. It has the most competent TIFF-import facility we have seen in any program. Its only serious contender, Corel Draw was not tested, and may well be just as TIFF-capable. The two 'big guns' in DTP (PageMaker and Ventura) are obviously of interest to most scanning candidates, and we wouldn't choose between them on your behalf. Both conform to the current TIFF specification.

We were shocked and disappointed to find that the big names in paint programs just didn't comply with one of the most basic requirements of the TIFF specification. This may be because they have grown out of the 'hobby end' of the PC market, and are perhaps still written by 'hobby programmers', whose programming style is more empirical than 'by the book'.

SLED looks like being the big winner, being the only paint program to conform to the recent TIFF standards, and having generally good editing features as well. It also exports both TIFF and PCX formats, and performs some neat tricks for printing graphics on laser printers. But, if you don't care about global TIFF compatibility, and you intend to try OCR now or in the future, Image-Scan/Paint is worth a look, as it integrates with Image-Read for OCR. You'll need Windows to run the Image-In suite.

If you don't require the general drawing and filling capabilities of paint programs, but only want a pixel editor to clean up scans prior to using them for DTP, then Optiks is good value for money. It has (very crude) pixel-editing capability, as well as other interesting image-manipulation features. More than this, it can import from dozens of graphics formats, and export to almost as many, enabling graphics

format conversions. However, it is a budget priced Shareware program, so expect many bugs and limitations (for example, the current version writes TIFF files without resolution information, making them unusable in programs like Designer). The full features of Optiks can only be obtained in the registered version – allow about two months after posting your order (and money) to receive the registered version from the author in the US.

In the field of OCR, Carets/Deluxe is the only TIFF compatible application tested. However, it is a program with only simple capabilities (as its price would suggest), in particular, being limited to a single font on a page with no graphics whatsoever. Within these restrictions, it does its job well. Again, if global TIFF compatibility is not an issue, Image-Read, at over three times the price, has at least three times the capability.

Windows swap files

I am running Windows 3.0 on my Wyse '386, and am trying to create a permanent swap file on the hard disk – it's a 300Mb unit, so a few megabytes for a swap file is neither here nor there. However, when I follow the instructions in the Windows manual for creating a permanent swap file, I get a message that the disk clusters are the wrong size, and that I can only use a temporary swap file, but the temporary swap file is a little too slow for my liking.

**Jan Harris
Moana, SA**

It sounds like you're using Wyse's own Dos 3.31, which is specifically designed for large disk partitions. This version of Dos (and similar ones from Compaq and others), got around the 32Mb limit by increasing the cluster size from the usual 2K, up to something like 20K (in the case of a 300Mb partition). This saved the user's having to split the drive into 10 partitions, and worked with most software – Dos can support large partitions, however, its own format program can't normally create them.

In order to make the permanent swap file as fast as possible, Windows bypasses the standard Dos file operations, and works with the disk sectors directly. However, the problem with this approach is that the flexibility of Dos' cluster handling is lost, and to incorporate this flexibility into the driver for the swap file, would presumably slow down its operation.

There are really three solutions to this problem – or two solutions and a 'cop-out'. The cop-out is to put up with a sluggish temporary swap file. However, since Windows has to operate through Dos, and the file could possibly be fragmented, it is not very fast, as you have found out.

One possibility is to partition the hard disk so that you have one partition of the disk of 32Mb or less, so that the cluster size is the standard 2K, and use all or part of this partition for the Windows swap file. The other is to re-format the disk under Dos 4.0, which lets you have large partitions *and* 2K clusters. However, this could cause problems with some disk utility software, so you might find that they need upgrading at the same time.

Hard disk maintenance

In Bruce Iliff's 'PC Maintenance' in June, he advises re-formatting a hard disk every six months 'to keep the disk in working condition'. If re-formatting is not carried out, how long can a hard disk be expected to continue reliable operation? If re-formatting is required, shouldn't a low-level re-format be required, rather than just a logical re-format? Digging for information on computers always uncovers more new questions than answers for old ones. Keep up the good work.

**Ross Byrne
Albany Creek, Qld**

It's true that it is a good idea to re-format your hard disk occasionally, although the reason given in the aforementioned article could be a bit misleading. The physical deterioration of the magnetic coating on the surface of the disk is not the real problem – it happens so slowly that other sources of wear tend to overtake its effects. However, there is a good case for periodically re-formatting a hard disk, to make sure that all the data on the tracks are aligned correctly.

When a hard disk warms up due to use, it starts to expand – the disk platters grow a little, and the head actuator arms get a bit longer. This causes the sectors written to a cold disk to be slightly out of line with those written when the drive is warm. That's why cooling is important – the hotter the drive gets, the more out-of-line the sectors become. Each track eventually starts to look like a higgledy-piggledy mess, and with normal wear and tear on the head actuator, the drive may begin to have trouble aligning the heads with some of the disk sectors. □



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MONITORS

Stewart Fist considers the changes to PC display technology after IBM introduced EGA.

LAST MONTH we looked at the problems of monitor bandwidth and its relationship with horizontal and vertical resolution. We also examined more specifically how the IBM MDA and CGA, and the Hercules HGC/MGA and HGC Plus display controls work.

This was a convenient point to break the article into its parts because the technologies of screen control and of monitors changed substantially when IBM introduced EGA. And, they changed even more with the VGA and Super VGA standards, and the many later variations on VGA – specifically Enhanced and Super VGA. This month, we'll look at these systems.

EGA (enhanced graphics adapter) was IBM's second color monitor standard for PCs, and EGA quickly became the de facto standard for most personal computers with MS-Dos as the operating system. It is not a very high-quality screen standard and still has programming difficulties. It was superseded by VGA which arrived a couple of years later, although there are still many games being released exclusively for EGA because it has become the de facto 'home computer' standard. EGA software can run on VGA systems, which helps this process along.

When EGA was introduced, IBM also changed their monitor hardware technology. CGA used a 'composite' transmission system to feed its monitor (it's similar to the single-cable feed between a VCR and a television set) where the red, green, blue and synchronising signals were combined into one 'composite' signal before being sent to the monitor. The new EGA standard used red, green and blue 'digital' signals traveling down independent lines between the display card and the monitor.

Don't confuse RGB with digital, or digital (necessarily) with TTL. RGB sim-

ply means that the control signals for the individual electron guns (whether digital or analog) are communicated between the display circuits and the monitor by individual wires in the cable.

The possible alternatives to RGB in color monitors are 'composite', where all signals are simultaneously merged together into one signal on one wire, and 'component', where the signals are all sent down one wire but in bursts, separated in time (this system is not currently used).

Just to complete this picture, there are variations on RGB (of which EGA is one), where multiple signals setting different brightness levels are sent down extra wires (RrGgBb). And, there's also a range of 'difference' techniques – where a luminance (brightness or Y) signal is transmitted along with two color 'difference' signals (Y-U and Y-V). These component and difference technologies are studio technologies only at present, so I won't go into them further.

Digital versus analog

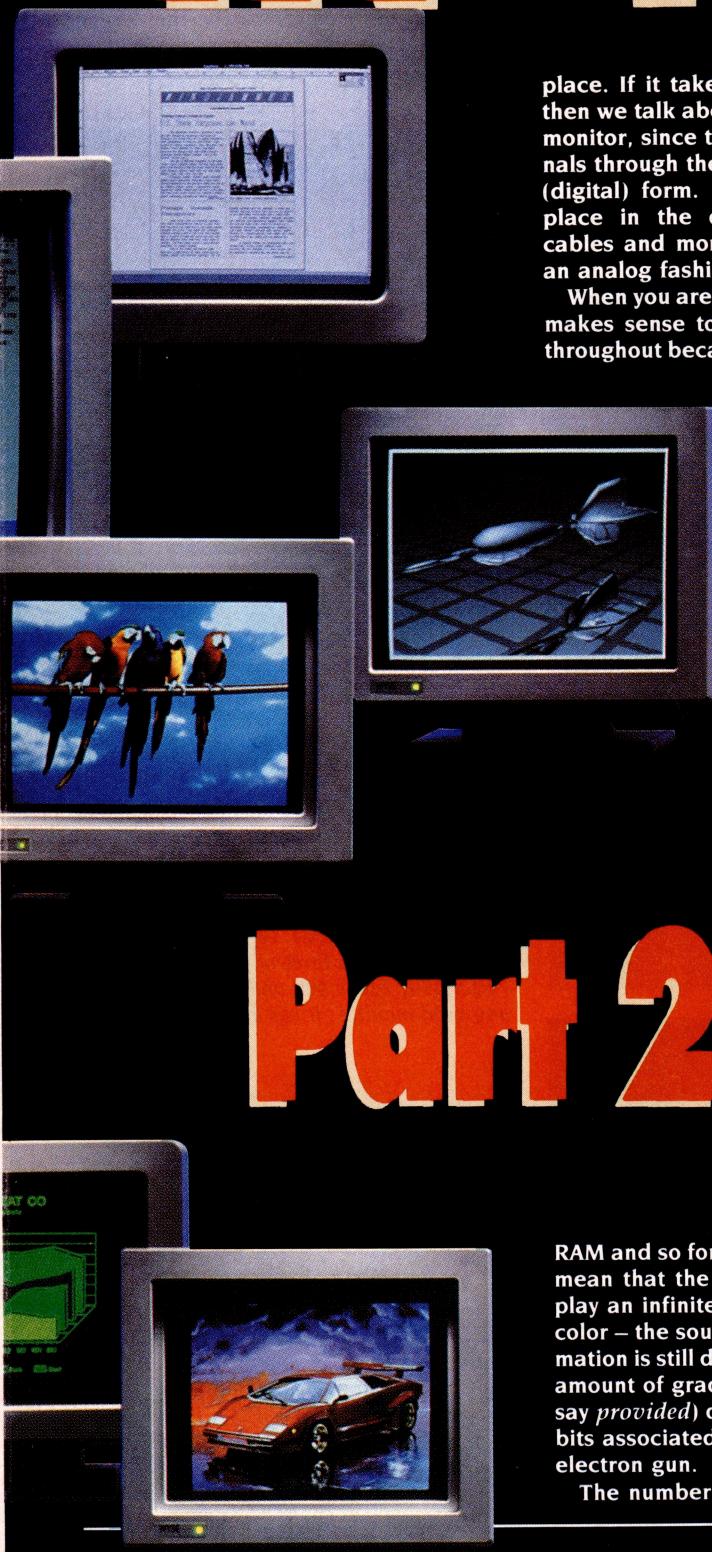
THERE'S SOME confusion about digital versus analog monitors – and in truth, there's not that much distinction. With computers, all signals are in digital form, and in color and grey-scale monitors all 'screen painting' is variable (analog) to some degree. So, somewhere between the two we must have some form of Digital-to-Analog (D-to-A) conversion – even if it is just in the reaction time of the electron gun to the changes in voltage levels.

So, the question of analog versus digital with monitors, really only refers to where the D-to-A conversion takes



Monitors courtesy of Wyse Technology.

IN FOCUS



Part 2

RAM and so forth. However, this doesn't mean that the analog monitor can display an infinite range of graduations of color — the source of all the signal information is still digital in any case, and the amount of graduation possible (I didn't say *provided*) depend on the number of bits associated with the control of each electron gun.

The number of 'palette' colors avail-

place. If it takes place in the monitor, then we talk about it as being a 'digital' monitor, since the display card and signals through the cables are all in on-off (digital) form. If the conversion takes place in the display card, then the cables and monitor operate entirely in an analog fashion.

When you are simply displaying text, it makes sense to use digital techniques throughout because you only need black and white on the screen — you don't want shades of grey or color (except from the color of the phosphors in green and amber screens). However, to produce realistic grey-scale or tonal-color renditions, we need multiple bits to be translated to colors or tones, and we don't want to feed the monitor with dozens of parallel digital-carrying signal lines. Thus, it makes sense to perform the D-to-A conversion in the display card, and feed it as a RGB analog signal to an analog monitor. The monitor is more flexible also — you can begin with a cheap card with limited modes, and update it later by adding a different display card, more video

able (possible) is therefore the product of these three color-gun driver 'bit' numbers — while the number of colors simultaneously available (provided) on the screen depends on the 'pixel-depth' which is the number of bits that the computer has allocated for each pixel memory location. This is a variable amount, set by your choice of modes.

Because there is often a difference between the number of bits that can be stored at each pixel location, and the amount of variations possible, we use a CLUT (color look up table) to decide which of the possible range is provided at any one time. Hence, the statement that '16 colors are available out of a palette of 64' and so on.

With computers, all signals are in digital form.

Digital techniques were used in monochrome and the early color monitors because it was cheaper and easier to handle the signals in digital fashion. They are also less prone to cross-talk (interference) than analog signals in a feeder cable, and all the electrical and electronic standards can be more relaxed.

You'll see the term TTL used for these monitors, and that simply means 'transistor-transistor logic', which tells you exactly nothing unless you've delved into the innards of computers. TTL is actually an electrical standard, and it means that the signals between the computer's display card and the monitor are passed in digital (on-off) fashion using DC changes of five volts. There is also a standard called ECL (emitter-coupled logic) which uses quite different voltages. ECL chip design is much faster, but more expensive than TTL, and obviously an ECL display card needs to be used with an ECL-standard monitor input.

MONITORS IN FOCUS

When IBM decided to introduce EGA as a color standard, it also fixed on TTL signals in a RrGgBb form. In simple RGB monitors, the three color electron-guns are simply switched *on* or *off* which gives you eight possible color states (counting all-off = black, and all-on = white, each as one color), but in the EGA system they have provided two control wires to each electron gun, so these are known as RrGgBb monitors.

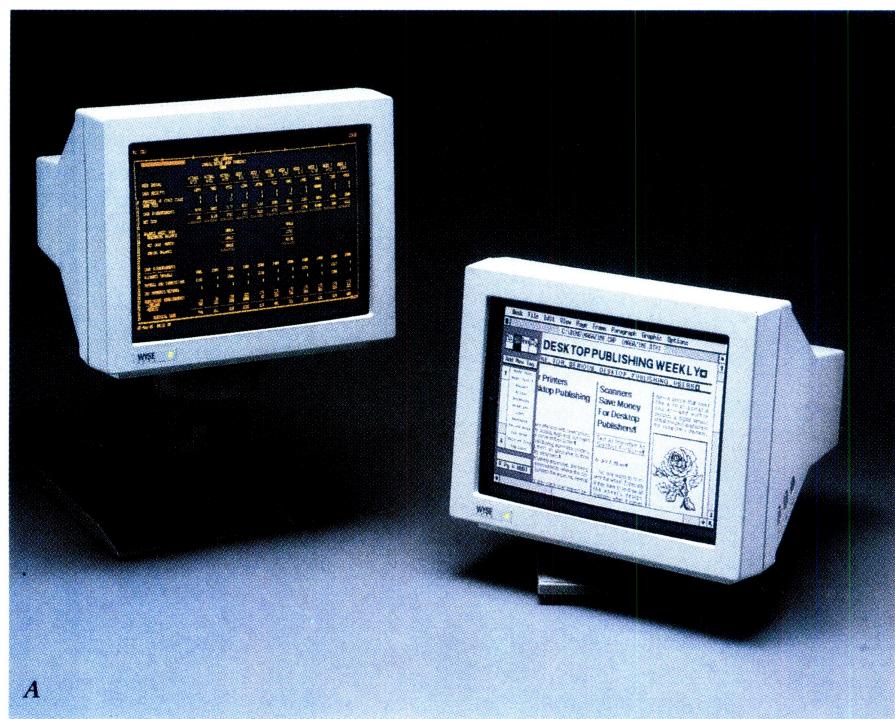
You will generally find that technicians think of these two wires as being a 'high' intensity channel and a 'low' intensity channel, since the attribute bytes associ-

ated with each text character have a bit which sets a low/high intensity choice. But with graphics, the two wires can provide you with four states (00, 01, 10, 11) and so each color-gun can be set to off, low, medium, or full intensity. The decoding of these signals is built into the monitor.

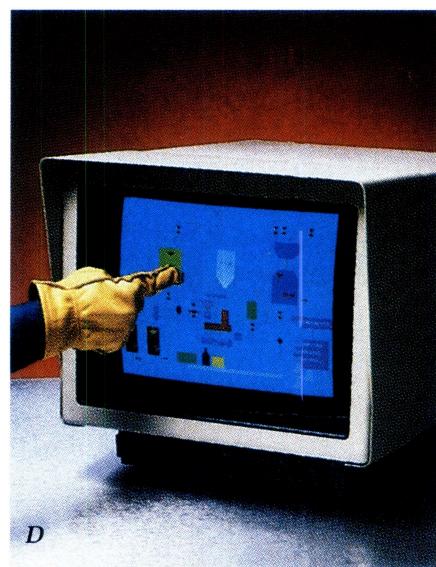
Since each of the three electron guns has four fixed levels of brightness (counting 'off' as one), the number of color combinations possible with an EGA monitor is four to the third, or 64. The 'palette' of color possibilities is set by the CLUT, and only 16 of the 64 possibilities can be used at any one time because the pixel-depth

(the number of bits which control each pixel) in video RAM is limited to four.

In this mode you can calculate that $640 \times 200 \times 4 = 512$ kilobits or 64 kilobytes, which is one segment of memory. VGA inherited this segment limitation from EGA also, which is why the official VGA standard with 256 available colors (requiring 8-bits and an analog monitor)



A



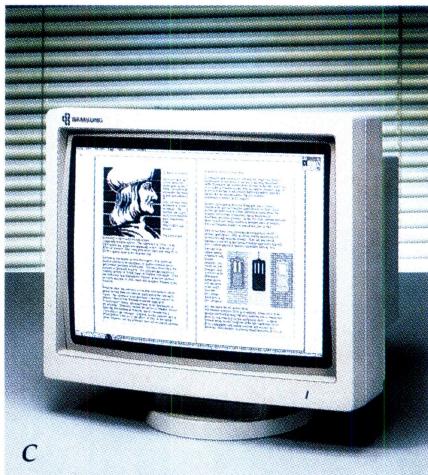
D

A) Not all VGA monitors are color - Wyse, for example, have a range of monochrome VGA monitors with flat non-glare screens in a choice of amber or paper white phosphors.

B) Samsung's CJ4581 14-inch VGA monitor supports three of the VGA modes: 720 x 350, 720 x 400 and 640 x 480. Like any good monitor, it has a non-glare screen.

C) In desktop publishing, size and clarity is more important than color - Samsung's 20-inch MU9511 displays 1280 dots by 1024 lines; the non-interlaced refresh rate is 63Hz and the bandwidth is 100MHz.

D) For industrial applications, Melbourne-based Intelligent Systems have a range of monitors in dustproof and water-tight cabinets (air-conditioning and insulation optional). The CGA/EGA version is priced at \$5787 and the VGA/SVGA system (pictured here configured as a touch screen) is \$5944 for the basic system.



C

is only available at a resolution of 320 x 200 pixels.

IBM's initial implementation of EGA has a maximum resolution of 640 x 350 pixels and displays its text in 8 by 14 character cells. However, it also supports all the main CGA and MDA text and graphics modes (but not the Hercules graphics). EGA was very quickly cloned, however, and many of these compatible implementations provided for Hercules graphics.

You will remember that MDA and CGA systems reserved 4K of memory specifically for the storage of video text characters in ASCII – and that these bytes each had an 'attribute' byte attached. And, since CGA also had graphics capabilities, it had a 'bit-mapped' section of video RAM at a higher location (both memory areas were above the 640K active RAM limit of Dos).

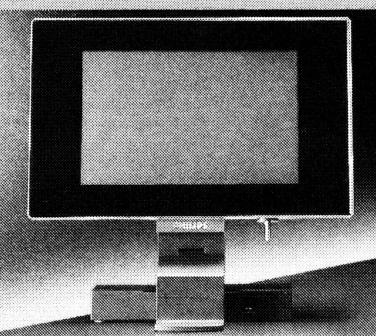
RGB simply means that the control signals for the individual electron guns (whether digital or analog) are communicated between the display circuits and the monitor by individual wires in the cable.

EGA now merged these two forms of RAM storage (ASCII and bit-map graphics) into a possible 256K slab of video memory divided into 64K hardware segments. However, when the PC is running in some of its earlier modes, EGA will still treat the lower 4K of video RAM as a repository for ASCII and attribute bytes. In the text mode, these bytes are first sent to a attribute decoder and character generator, then on to the display-card's video signal generator as before.

EGA provides four font types, although only two can be used at any one time. The later VGA doubled this, which allowed them to provide the higher-quality 8 by 14 character text in addition to the older standards.

LCD screens

THE GAUSS Group report into the future of computing saw the disappearance of conventional cathode-ray tube technology by the end of the century. The report maintains that 'advanced technologies, especially LCD are rapidly approaching the resolution and color capabilities of CRTs'. Philips, for example, have a backlit monochrome LCD screen (pictured) with a resolution of 640 by 400 pixels.



Toshiba has already demonstrated a color LCD with a resolution of 720 by 550 pixels with four (instead of the normal three) dot-elements for each pixel. They have boosted the LCD performance by using the normal three colors (red, blue and green) and adding an extra luminance pixel to improve screen brightness.

Matsushita also claim to have solved the problem of screen brightness of LCDs with a new flat-panel that uses a hybrid of the conventional flat-panel and CRT technologies. The report isn't clear on how this works, but it supposedly uses an electron beam in some way and produces a high quality color picture.

Some displays, under development, have nearly reached a useful limit with 1280 x 1024 pixels and 256 (8-bit) colors. 'Color and resolution will soon begin to outstrip the ability of the human eye to distinguish individual elements,' says the report. 'The remaining task is to enable the displays to change quickly enough to give the illusion of smooth movement.'

In the new graphics modes associated with EGA however, the pixel controls are handled by a new 'planar' process. Under CGA, if we had 16 colors available for each pixel then we must have had a pixel-depth of four, and the video memory was orga-

nised in sequential groups of four bit 'nybbles' (or half-bytes). So, the first nibble in the video memory controlled the color of the pixel at top left of the screen, and the next nibble controlled the one to its right and so forth.

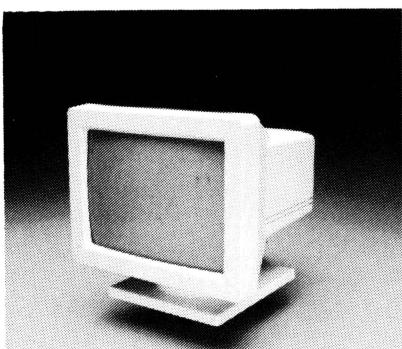
With planar architecture, the most significant bits from each nibble are stored in order (occupying, say, 16K of space), then the next significant bits are stored again in order (occupying the next 16K) and so on. If you have a 640 x 200 pixel screen and a pixel-depth of four, then you need four planes, each of 16K which is the maximum that can fit into one memory segment.

However, the planar approach allows you to use a number of video RAM segments without having a segment-break occurring in the middle of the screen. You can't speak of nybbles any more because adjacent bits always belong to adjacent pixels – never to the same pixel.

This planar approach to storing the screen data in video memory is also supposed to have many advantages in updating the screen quickly and in handling

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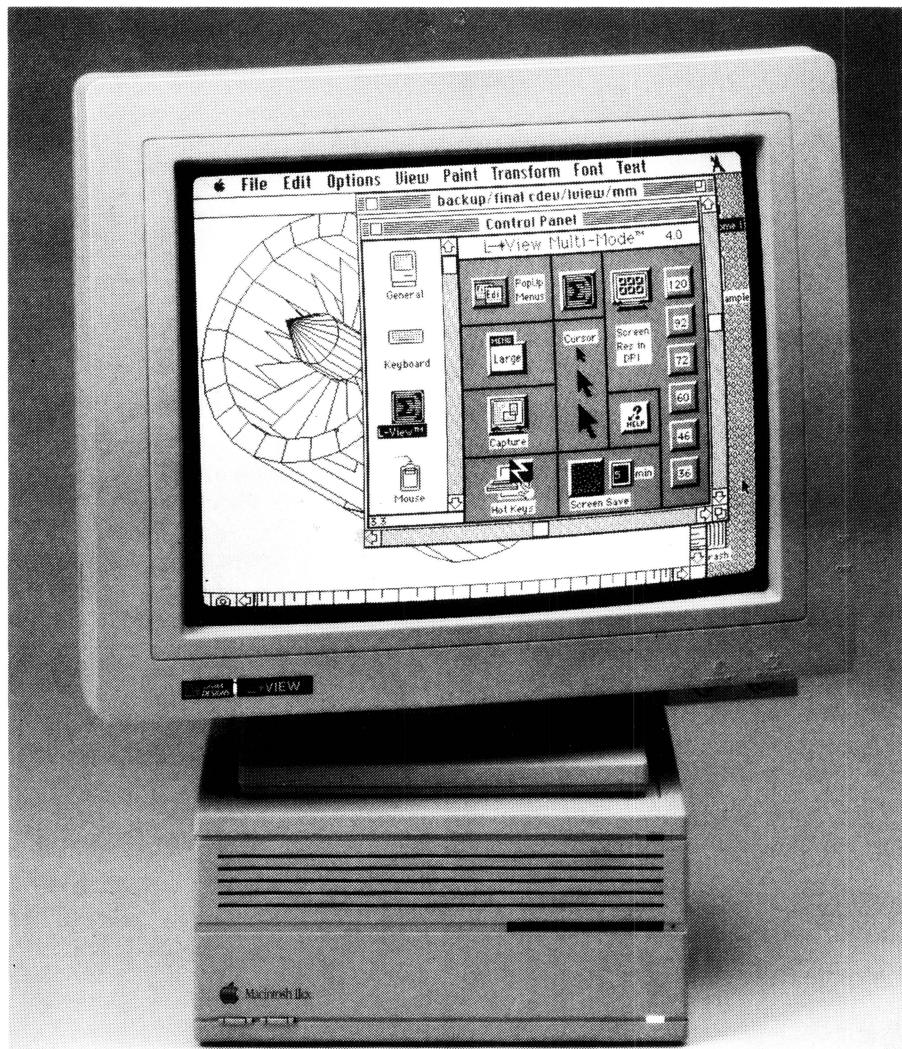
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windows and so forth. It is noticeable that the Macintosh is also moving over to this system. Remember, EGA systems only treat the video memory in this way when they are using the new EGA (and VGA) modes, not under the old CGA modes.

Mode-changes are made by modifying the value in a special register, and the software can write to both video memory direct and to this register direct if the programmer wishes, or it can access the system by way of the BIOS. The danger of writing the changes direct, is that the software writer must assume that every display card and monitor combination uses exactly the same memory locations as

IBM, and that is not always the case. The danger of writing via BIOS, is that not every implementation of BIOS for EGA systems is perfect (EGA cards have their own BIOS on-board) although they are generally pretty good now, albeit a bit slow.

So, EGA was an improvement, but not at all as dramatic as MS-Dos users (especially those involved in drafting and CAD/CAM) had been hoping for – which lead to the development of Enhanced EGA by clone and monitor makers. The main change they made with Enhanced EGA was to expand the number of bit-planes to eight, making 256 colors possible as long



Melbourne-based Computhink is offering Sigma Designs L-View Multi-mode display systems for Macintosh II users – the 19-inch unit has a non-interlaced display with a 92Hz refresh rate, and six display modes (from 36- to 120dpi).

THE VIDEO bandwidth (dot-clock rate) has a direct relationship with the number of dots that can be discriminated across each horizontal line, and it is measured in megahertz. It is often also referred to (incorrectly) as 'resolution'. You must have sufficient bandwidth to provide a certain resolution, but otherwise the two are not directly related.

It is difficult to compare bandwidth requirements between the various modes and standards because it is measured in terms of dot-cycles (black to white changes) possible over a second, and that involves complications of different screen refresh rates and different numbers of lines.

The lowest bandwidth requirement is CGA in its 640 by 200 pixel mode (14.3MHz), while MDA and EGA require about 16.3MHz, and VGA, up to 25.2MHz. Be aware that the bandwidth requirement for a double-width or double-height screen will rise accordingly. If there are twice as many lines to scan (or twice the length of line) then you need twice the bandwidth to retain the same resolution (the factors being equal) – it's simple mathematics.

By the same token, the use of an interlace system (with the Super VGA) cuts the bandwidth requirement by 50 per cent, since only half the number of lines are drawn every second (assuming the vertical frequency remains the same, and the line lengths and line numbers are constant).

Horizontal scan frequency – the rate at which individual lines are drawn on the screen. It is the product of the vertical frequency (screen refresh rate), and the number of lines, including those required for the vertical blanking interval (or 'fly-back'). And, it is measured in kilohertz.

In its low resolution mode, CGA requires a horizontal frequency of 15.8KHz which is the lowest horizontal scan rate of all IBM monitor standards (even lower than MDA at 18.4KHz) because it only uses 8 x 8 character matrixes, whereas

as there was enough video RAM. Genoa Systems and a few other third-party companies also branched out into 800 x 600 displays, but IBM didn't follow – it introduced PGA instead.

PGA

PGA (PROFESSIONAL graphics adapter) was IBM's attempt to establish itself in the CAD/CAM workstation market with a

Interpreting the specifications

EGA needs 21.8KHz for the 640 by 350 mode, and VGA and MCGA need 31.5KHz for all modes. Slightly higher rates are needed for some Super VGA systems.

Vertical scan frequency (screen refresh rate) – the number of screens that are drawn (refreshed) every second. MDA was a 50Hz system, while CGA was boosted to 60Hz, and VGA to 70Hz. The primary value of the higher vertical frequencies is to overcome flicker problems without the use of long-stick phosphor screens. As graphic interfaces become more popular, they need to use faster-fading phosphors, and increase the scan rate accordingly. Bigger screens also tend to flicker more, so higher rates are needed here also.

You will notice that many VGA-compatible screens *do not* function at the 70Hz vertical frequency. This is acceptable if they are used only with a compatible display card, although the slower refresh rate will reduce the screen's reaction time, and the image may tend to flicker more if the right phosphors haven't been used. Slowing down the screen refresh rate is a technique that monitor manufacturers use when they have problems in providing sufficient bandwidth. So, sub-standard rates are probably a good warning of a monitor technology that has been stretched to its limits.

Resolution – as used by the monitor industry, is a measure of the number of pixels (horizontal times vertical) that can be displayed within a given area on the screen. Sometimes the full screen, including areas behind the bezel are quoted, but generally only the visible area.

However, if I display a 640 x 200 VGA image on a monitor capable of 800 x 600 pixels, I don't increase the resolution of the image at all. With the IBM system, the software generally can't take advantage of this area unless it has specifically been written with these larger screens in mind. In the Macintosh, larger screens are automatically used as larger displays by almost all software.

screen resolution of 640 by 480. This was IBM's first analog monitor – and it was expensive. But it provided 256 colors (from eight bit-planes) out of a possible color pallet of 4096, using a 12-bit CLUT to drive the A-to-D converter.

PGA also departed from the normal line in a different way. It had an on-board processor and a lot of memory, and it was used in CAD applications as a 'vector' display system. The idea was that the com-

Rated screen size – as with resolution, this is meant to be the diagonal dimensions of the visible area of the screen – not the dimensions of the monitor tube behind the bezel.

Non-reflective screens – in many open office locations, a non-reflective screen is essential – especially if you are not able to control the lights (or windows) behind you. If you have a bright reflection constantly in your field of vision, your eyes will automatically 'chase' focus between the screen and the reflection, and after a couple of hours this can cause tiredness, and it will exaggerate (not cause) eye-strain. Good screens are lightly etched to remove the gloss surface and reduce reflections.

Dot size – monochrome monitors generally do not have a masking screen, and therefore do not necessarily show dots. Their images are composed of horizontal lines.

Color screens must use a shadow-mask, and the hole size in this screen is often quoted with the implication that it effects resolution and quality. The mathematics are complicated, but the effect of dot-size on resolution depends also on many other factors, and generally, it makes very little difference. The bright spot on the screen is usually a donut-shaped interference ring anyway – not an image of the hole in the shadow mask.

Dot pitch – is a measure of the distance between the dots, but dot size and dot pitch are constantly confused in brochures. Dot pitch, in effect, gives you a measurement of the pixel size, and since there are a set number of pixels across any one screen, this dimension is a mathematical necessity.

Pixel shape – generally the standard pixel shape for color screens is the alternating horizontal triangular grouping called a 'triad', although Sony uses a vertical stripe system. The aspect ratio of each pixel is ideally 1:1 (as high as it is wide) but some of the early standards

computer could send vector commands ('draw line 45 degrees from x,y' and so forth) to the display card, and the on-board processor would convert these into bit-mapped images and feed them to the screen. PGA was not a raging success, except perhaps in the scientific world; CAD/CAM users already had standards which were better for their purposes.

Much the same happened with MCGA (multi-color graphics array) which IBM in-

used a pixel with an aspect ratio with more height, and this can cause image distortion, for example, circles become oval.

Even in some monochrome screens, the pixel shape is significant in terms of the screen's readability. The original Macintosh only had a screen with an average number of pixels but it used square, rather than round dots, and as a consequence, the image quality for both graphics and text characters was much improved.

Distortion – because the corners of a screen are further from the electron guns than the centre (or from the extremities of the horizontal and vertical 'equators' of the screen), the normal condition of a cathode-ray tube display is to produce pin-cushion distortion. A rectangular box on the screen will appear to have bowed-in sides like a pin cushion.

So, pin-cushion correction circuits are built-in to all monitors, and they must be set correctly to counter this intrinsic defect. If the monitor has been under-corrected, the sides will still bend in, and if it has been over-corrected, they will bulge out (barrel distortion).

Use the full-screen 'MMMMMM' check to examine for pin-cushion and barrel distortion. Check the alignment of the color guns at the outer edges of the screen at the same time. The guns can produce pure white in the centre of the screen, but have a color hue (if misaligned) at the edges. You'll see this as color fringes around the edges of the characters. Take a magnifier with you to the retail store and you'll see these defects easily.

Power supply – monitors can either draw their power from the computer or direct from the mains. This can make a difference to the heat generated within the PC, and if you've already packed your PC full of add-ins, you could be in danger of overloading the power supply if you use the in-built supply as the monitor source.

introduced with the PS/2 line as a low-grade version of VGA for the old 8086-based Model 30 machines. IBM thought that they would be able to prevent cloning of MCGA by mounting it on the motherboard in a custom gate-array. They were right – but for the wrong reasons. No-one bothered. And, when IBM later re-invented their Model 30 with a '286 chip, they dumped MCGA and replaced it with VGA.

VGA (video graphics array) was a very

substantial change in IBM's line because it was the first analog standard for general use (discounting the specific application of PGA and the non-event of MCGA).

VGA was included on the motherboard of Model 50 '286-based PS/2 machines, but you needed an adaptor for clones, existing XTs and AT-bus machines. It was backwards compatible with CGA and EGA and it added another two new modes: 640 x 480 with 16 colors from a palette of 256, and 320 x 200 with all 256 colors.

It is a superset of EGA and, in fact, the similarities are so great that you can tell a VGA-equipped machine that you are using the EGA display and monitor standard, and it will run EGA programs. VGA is primarily a RGB analog system, but there are digital VGA monitors, apparently. I haven't seen one yet, so I won't comment.

In its 80 x 25 text mode, VGA defaults to 9 x 16 characters for higher quality, and it allows up to eight screen fonts, as against four for EGA (although still only two at any one time). And, since it supports all the earlier standards, it also can handle the 8 x 8 fonts of CGA and the 8 x 14 fonts of EGA.

VGA is obviously the best system to use at the present moment. Although EGA had been touted as the general standard for most PCs, as soon as VGA arrived there was a rush to convert to the new system – both by users and by programmers.

The faults of VGA are many, and most of them stem from IBM's desperate efforts to make the system difficult to clone, and a

Double page/double height

IF A monitor is to be able to handle many more pixels in width than the standard, then the horizontal frequency must also rise in proportion if resolution is to be maintained. For a standard VGA monitor you need 31.5KHz horizontal frequency, but if you double the number of pixels displayed along each line, then you must double the horizontal frequency and the bandwidth.

Similarly, if you have a vertical A4 screen which has double the normal number of text lines displayed, then the monitor must also have double the normal horizontal frequency (it has to draw twice as many lines in the same 1/60th or 1/70th of a second) and double the normal bandwidth.

Double-page CGA screens require about 50MHz of bandwidth and screens in the 1024 x 1024 pixel range need about 66KHz of horizontal frequency just for mono displays (one bit per pixel).

few from the need to preserve backward compatibility. Every time they add a new mode, they increase the complexity of the video processing circuits enormously anyway, and to this complexity IBM added a new BIOS, special registers (and they changed from write-only to read-write

registers) all of which were necessary improvements. But then IBM crammed this lot into a large custom gate-array chip and defied the clone makers to risk the 'wrath of the law' by copying the complexity.

They seriously underestimated the skill of the cloners: it took only a few months of reverse engineering to find a number of ways around the copyright material and then the first cloned chips began to dribble out. But the results weren't good – for some time we had the dreaded '99 per cent compatibility' where no-one ever knows when that last one per cent is going to show up. Does the display system fail with only one in every 99 applications, or once in every 99 user-sessions?

You've got to be careful when accepting compatibility claims because cloned display systems can be compatible either at the BIOS level, at the register level, or at the full-system hardware level. One hundred per cent compatibility at one level doesn't guarantee programs will work – a display system might perform perfectly with some software, but not with others, depending on whether the software writes to video through BIOS or direct, and whether the software is able to turn on, and use all the modes available.

And, even if the system is compatible at all three levels, there could also be timing and other problems with some software. There is no easy way of knowing without exhaustive trials, although most cloned VGA systems work with most standard VGA software.

Graphic Standard	Mode	Bandwidth (MHz)	Horz. Freq. (KHz)	Vert. Freq. (Hz)	Monitor Type	Character Size
MDA	Text only	16.3	18.5	50	TTL	9 x 16
Hercules	723 x 350	16.3	18.5	50	TTL	9 x 16
CGA	320 x 200	14.4	15.8	60	Composite	8 x 8
	640 x 200	14.4	15.8	60	TTL	8 x 8
EGA	640 x 350	16.3	21.9	60	RrGgBb	8 x 14
	720 x 350	16.3	18.5	50		8 x 14
VGA	320 x 200	25.2	31.5	70	Analog	8 x 8
	640 x 350	25.2	31.5	70	RGB	8 x 14
	640 x 400	25.2	31.5	70		8 x 14
	640 x 480	25.2	31.5	60		8 x 16
	720 x 400	25.2	31.5	70		8 x 16

Table 1. Each of the IBM graphics standards is backward compatible with earlier ones. In TTL monitors, the signal between the display adapter and the monitor is digital (on or off); CGA uses a single 'composite' signal, comprising the red, green, blue and synchronising signals; while simple color monitors use one wire for each color, EGA uses two, allowing additional video attributes.

Buying a display system?

IF YOU are buying a new display system, the main features to check are whether all VGA characters are available in the text mode and whether all 256 colors are available in the graphics modes. You should also check split-screen functions, and that the screen smooth-scrolls in the higher-resolution graphics modes (but also check it in the low-resolution modes).

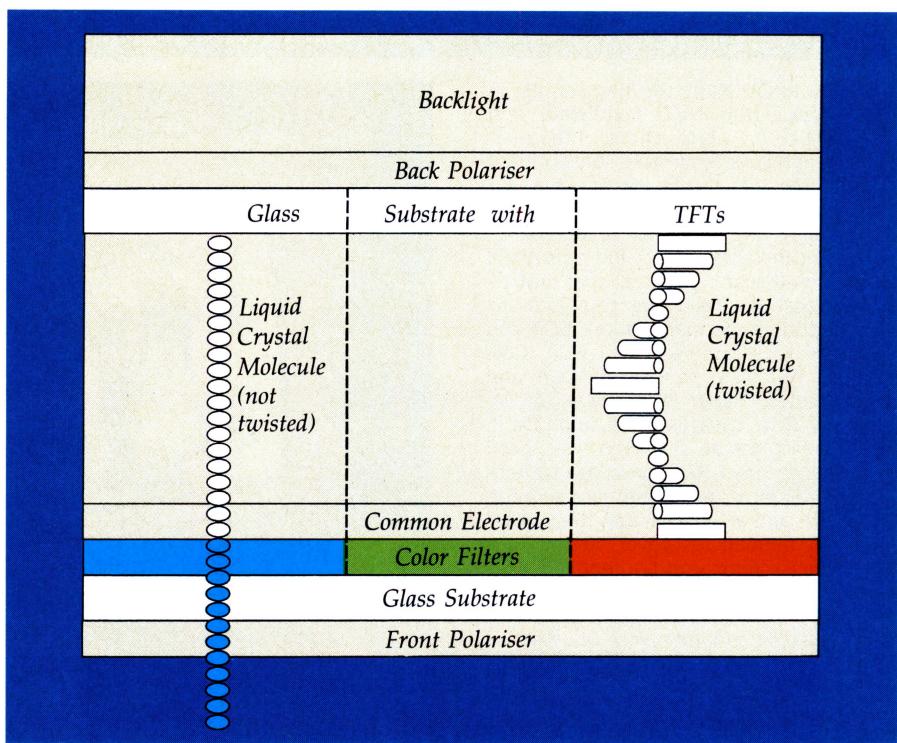
You will also find that many add-in cards aren't able to provide the full range of modes required to support past systems and software, and some of them have timing-problems. Video Seven's V-RAM board, Vega's VGA board and Fast-write VGA all seem to perform fairly well in most modes, but some others have problems – especially with Windows.

The major compromise that IBM made to preserve backward compatibility with CGA and EGA, was to build the VGA card as an 8-bit device even though it can only be used on 16-bit machines. This forced IBM to add 'wait states' (and slow down the processing) while the 8-bit data is transferred as two bytes to a 16-bit bus. The techniques they used for handling the graphics cursor also soak up CPU time, and they also retained EGA's four 64K bit-planes which limited the system to the 16 colors in the higher resolution (640 x 200). The 256 colors available in the 320 x 200 mode was only possible by returning to the old byte-per-pixel architecture, and abandoning the planar approach.

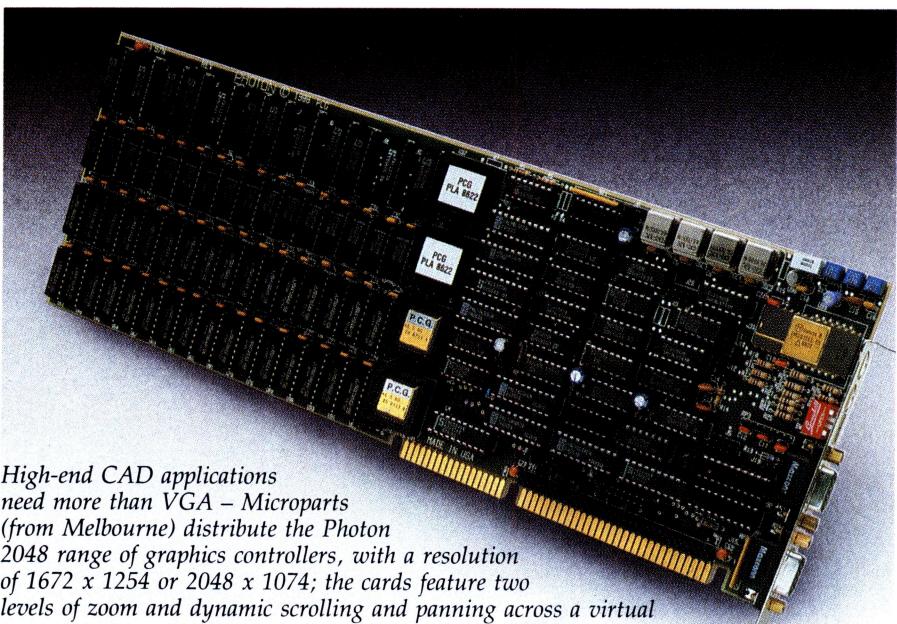
These defects have given cloners the advantage of being able to produce better VGA products than IBM because they aren't so concerned with backward compatibility. There is always a trade-off when you buy 'standard' equipment with new features.

Not too long after VGA arrived, the Video Electronics Association (the chip and board makers) decided to extend the standard to include a 800 by 600 pixel resolution mode. Initially, they called this Enhanced VGA, and later these developments were incorporated into Super VGA, which is a 'Clayton's' standard.

The decision was taken to 'interlace' the screen's line scanning with these standards because 'progressive' monitors (which scan all lines progressively from top to bottom) with the required bandwidths would have been too expensive for most users. Interlace scanning at 70Hz effectively halves the bandwidth because only odd or even lines are scanned in each 1/70th second cycle.



Hitachi is using a thin-film transistor (TFT) LCD in its color laptop range. Within the glass substrate are some 900,000 TFTs in an active matrix – the system gives about 5 times better contrast than other color LCDs. As a backlight, Hitachi uses a cold fluorescent light which helps keep power consumption down and gives evenly distributed lighting across the screen. (See Part 1 of 'Monitors in Focus' in our August issue for an explanation of twisted and nematic crystals.)



High-end CAD applications need more than VGA – Microparts (from Melbourne) distribute the Photon 2048 range of graphics controllers, with a resolution of 1672 x 1254 or 2048 x 1074; the cards feature two levels of zoom and dynamic scrolling and panning across a virtual image 16,000 x 16,000 pixels. The Photon 2048/50 (\$5170) supports any monitor with a horizontal scan rate in the 30- to 50KHz range and draws at 100,000 vectors per second; the 2048/64 (\$6400) supports all RGB analog monitors that operate at 64KHz and draws at 120,000 vectors per second.

Multiscan monitors

NEC PRODUCED the first multiscan monitor (the NEC MultiSync) and grabbed up a large chunk of the market, and later Sony stole some of their thunder with the Multiscan 1302. But since then, there have been many changes and many new standards.

For instance, you'll find advertised as 'multiscan', monitors that provide at least the following combinations (and there are many more): EGA and CGA; CGA and Hercules; EGA, CGA and Hercules; VGA, EGA, CGA and Hercules; Super VGA, VGA, MCGA, PGA, EGA, CGA, Hercules and Mac II.

Don't forget that you will need enough video RAM on-board to handle the most memory-hungry requirement, and also check that the vertical scan frequencies cover 50 to 70Hz. Some systems won't accept VGA analog, and others require a special cable to be used, and for Super VGA on a multiscan monitor, you will need a horizontal frequency of between 34 and 35KHz.



Teco's TE-1520 Multiscan Display has a resolution of 1024 x 768 and supports MDA, CGA, EGA, PGA, MCGA and VGA. It can automatically scan horizontal frequencies from 30- to 50KHz and vertical signals from 50- to 80Hz.

As a standard, Super VGA is supposed to be backwardly compatible with the modes and standards available from older systems (including VGA) and it now adds a new 640 by 480 pixel mode in 256 colors (with 6 x 16 characters) which gets the image pretty close to photographic resolution, and there's also an 800 by 600 mode with 16 colors and (8 x 8 characters). Super-extended VGA cards take the resolution (but not color rendition) even further by supporting 1024 by 768 pixels in a 4-bit (16) color mode with the better quality 8 x 16 characters. These modes require between 300K and 400K of video RAM.

The latest in this long, confusing line of video standards is IBM's new 8514, which is their successor to the now-defunct PGA CAD/CAM system. To get the full benefit of 8514 you need a special intelligent adaptor (there are a couple of versions – some with more intelligence than others) and a high resolution color monitor on any of the PS/2 range. Without the adaptor, any PS/2 machine is automatically a VGA machine.

I've tried to get information about the 8514 system out of IBM, but although it is regularly promised, it never arrives. This isn't a general display system for the average user, so I'm going to let it pass in this series. □

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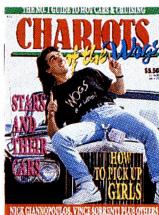
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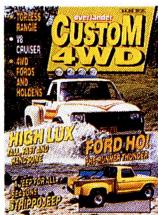
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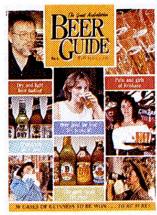
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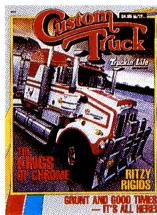
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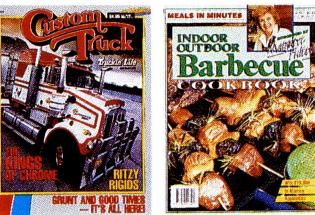
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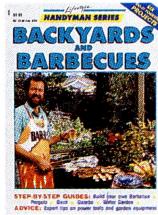
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BUYING AN ENTRY LEVEL PC

THE MOST common question we are asked here at YC by readers is 'what sort of computer should I buy?' In slightly different forms, the question is asked by two distinct classes of users: those who are contemplating their first foray into the PC world, and those who want either a simple upgrade (replacing one PC with another more suited to the tasks currently at hand) or who want to expand an existing system by adding more computers. In each case, the advice we can offer is essentially the same.

Cost

THE FIRST concern of most users (potential or existing) seems to be cost; after that support and performance run an equal second. (Although the V-8 mentality often wins – 'who cares if there's no warranty, it runs at 50MHz on an 8086!') Buying a computer is no different from any other major purchase: a budget needs to be set, evaluated and rethought, before any orders are given. Using a small business as an example, first, determine what benefits are expected in increased productivity and profitability. It's necessary to derive real *annual* dollar amounts: is the PC (or expanded system) going to save on office work; if so, what will be the savings in wages, either by doing with fewer staff or by not adding extra staff? Or, perhaps the computer is seen as a method of giving the business' principle time to get on with developing the business (after all, only accountants go into business to keep books, the rest of us want to practice *our* profession) – what value of new business is likely to arise from the extra time? Even such nebulous reasons as 'improve the quality of life by spending more time with the kids' can be assigned a

An 'entry level' PC is simply the basic system you need for the task at hand – it's your 'entry' to computing. Jake Kennedy describes how to make your first computer decisions effectively . . .

number for budget purposes, given some thought.

Once the PC's annual value to the business has been determined, halve the figure. If it's less than \$6000, think about

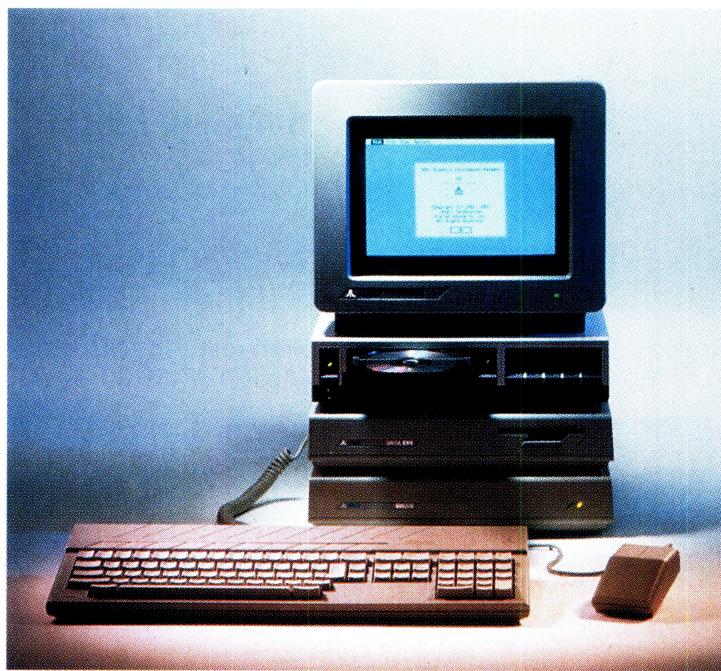
whether a computer is really necessary, or, are you not expecting enough from it? (That figure isn't arbitrary: \$3000 is a good ball park figure for a basic business system and doubling it gives a workable basis for decision making. Besides, installing a computer is going to cause some disruption to the normal flow of work, so make it justify itself.)

Most small businesses which I've seen in this situation and then go on to purchase, come up with a figure between \$7500 and \$20,000. This is a good indication of the *most* you should spend, based on recommended retail prices. Keep all of your calculations on the conservative side as it is a good hedge against the unexpected.

The next step is to do a bit of research. Personally visit a number of dealers to familiarise yourself with the current offering, and with the dealership itself. Collect brochures, write down prices and ask what's bundled with the computer (that's marketing talk for 'what do I get for paying the price?' – there are usually good software deals to be had here, or even a printer). Don't be afraid to pester the sales people with questions, no matter how dumb you think they are (take that either way). How a vendor handles 'dumb' questions is a good indication of its attitude towards customers and is a reflection of the type of after sales service you are likely to get.

Do not even think of buying a computer or monitor that has less than a 12-month warranty – if the supplier doesn't have faith in the machine, why should you? Twelve months is a minimum – many suppliers are offering two years, and a few, even three.

After several weeks of 'shopping' and asking questions, you should have a fair indication of how much needs to be spent.



Once the type of software that's needed is settled on, the type of computer will suggest itself. While the IBM-type computers are ideal for many small business applications, more specialised tasks such as graphics or music publishing require more specialised machines – the Atari Mega ST (pictured) is popular with those on all sides of the music business because it is fitted with a musical digital instrument interface (MIDI) port (this supplies the connection for the CD player).

And – most likely, a fair amount of confusion. So – it's time to become more specific. Probably the biggest source of confusion to potential users is that there are a number of popular operating systems, each quite independent of the other. The operating system is the link between the computer hardware and the software. Each software package is specifically tailored to run on a particular operating system – which is the main reason that Macintosh programs, say, cannot be run on IBM-type computers.

The most popular systems are those run by Atari's ST range (called TOS), Commodore's Amigas (AmigaDOS), Apple's Macintoshes (The System) and Apple II series (ProDOS and GSOS), and all the compatible 'clones' that grew from IBM's 1982-model PC, running Dos (which stands for Disk Operating System). Since the decision here is so basic to those that follow, let's back up a bit ...

What type of computer?

WHILE WORKING on the budget discussed above, certain tasks would have been assigned to be 'computerised'. For example, bookkeeping and sales contacts might be areas where increased productivity is anticipated – while visiting dealers, ask to see packages that do these tasks. Is there a single package that does both? (The less software that needs to be learned, the quicker the business will benefit.)

The software has a significant bearing on the configuration of a machine – a PC that can just run the basic tasks mentioned above will be quite a different beast from one used for graphic design work, musical composition or text retrieval from a massive database.

Now, back to the 'which' question. If you use a PC at work, it makes sense to buy a similar machine for home (and vice versa) if similar applications are going to be run in both places. Another common reason for buying a computer is for the kids to use, either for recreation or education – it's then a good idea to buy the same type of computer that is being used at the local school.

It isn't so much that the kids will be familiar with the machine, it's that they have a resource in other users that they can turn to for advice or help. The same logic applies to a computer for use in business – if you buy a brand new software package, that no-one else has ever heard of, who are you going to turn to when it won't work with the printer?



Once you define your 'basic needs' and discover that four PCs is a minimum, it might be time to consider networking or hanging several 'dumb' terminals off a single server, such as the Wyse 386 model 3225. Running a 25MHz 80386, the machine has been designed for performance and expansion – there are five expansion slots available after a 150Mb hard disk is fitted; the tower will take up to five half-height devices. Wyse don't include a monitor in the \$13,000 price – for use as a network server, a monochrome monitor (from \$400) would suffice.

For any new user, an IBM PC, and its various compatibles and variations, form a group which is hard to ignore. There is a wealth of software available for it, commercially and as public domain (free) and Shareware (pay if you use it). Business applications are particularly well represented while education, graphics and music software are either less common or less sophisticated than that available with other machines for comparable prices.

The IBM and its compatibles may not cover any particular area of activity as well as more 'specialised' machines, but they tend to be the jack-of-all-trades, able to cope competently in most areas. As an example, our minimum recommendation for a small business system is a 20Mb hard disk, a floppy drive, 1Mb of RAM, a color monitor and a letter-quality printer with a draft mode. (If that sounds too technical,

you've got the first half-dozen questions to ask when shopping.) In the IBM world, such a system can be had for well under \$2000 – for basic business applications on the other types of machines, the prices will be about the same.

While the non-IBM machines are generally as capable at 'basic business applications' as the compatibles, they each have a specialised strength. If you are interested in graphics applications, it would be worthwhile looking at the Commodore Amiga range and the Atari STs. Both of these machines have a special 'blitter' chip in them which speeds computation-intensive graphics. The Amiga is popular with those who want to work with animation and video graphics. The Ataris have been popular with musicians for years (the machines have a built-in MIDI port) and are gaining a strong following in DTP

and animation. The Macintosh range is a common choice among graphics designers and those who require full-featured DTP.

Regardless of the type of computer, the decision-making process is about the same. However, there are more choices and confusions in the IBM world, so let's cover some background. The archetype 'personal computer' – the PC – was the original IBM PC, running a 4.77MHz 8088 processor. The 8088 is a microprocessor chip that functions as the central processing unit (CPU) of the computer – the CPU is the 'brains' of the computer. Since the PC, IBM and the clone makers have released the 80286-based AT and the 8086-based XT. The company that developed the chips, Intel, has since released more sophisticated members of the family, culminating recently in the 80486. There are two other popular families of CPUs: the V20 and V30 chips from NEC (which are generally IBM-compatible) and those from Motorola, the 68000 series. The Motorola chips are found in all of the brands mentioned above, except the IBMs and the Apple IIs.

IBM XT- and AT-class machines will suit most business applications, but let's clear up another area of confusion. When discussing a computer system, a speed, quoted in megahertz (MHz) is going to be mentioned: 'a 10MHz XT', for example. This is a measure of the CPU's clock speed which controls the number of operations that can be performed in a given time – the faster the clock speed, the faster the computer. Things like caches and wait states confuse the issue, but suffice to say most manufacturers offer a choice of faster and slower processors. Don't let processor speed *per se* influence your decision: it's only important if the software needs it, and it can be misleading – an Amiga with a clock speed under 3MHz is much faster at similar graphics applications than a 12MHz AT, for example.

If most of your work is text processing or simple accounting, a 10MHz XT or a 68000-based system will do the job. For more computer intensive tasks, such as working with large spreadsheets or simple DTP, an AT or 68020 system is a must. All technicalities aside, the most meaningful way of determining if a system is what you want is to use it – ask to be allowed to try a computer in the showroom for half an hour or so; after you've done this with three or four different computers, the differences in speed will become apparent (or not, depending on the software).

Under the cover

PERSONAL COMPUTERS all have a traditional form: a box on the desk (the 'system unit') with a monitor (display) on top, driven by a keyboard, and perhaps, a mouse. The system unit typically has a sheet steel case, with a cover that either slides off forwards after a few screws are removed, or has a lid which can be tipped up to reveal the innards. The most noticeable object under the cover is usually a very plain looking box, the power supply – before buying ensure that it is heavy-duty enough for your future needs. If you are likely to add a larger hard disk or other bits and pieces that draw from the power supply, make sure you buy a machine with over 150W available: much less and you'll be replacing it at some stage. The other sizable hardware bits of interest are the disk drives – it's worth noting how many 'devices' (additional floppy drives, hard disks, tape backup units, whatever), can be added before the case is full.

Flat across the bottom of the unit, usually running from front to back at the left side, will be a large printed circuit board full of electronic components – the motherboard. This is the home of the CPU and where the ubiquitous (optional) maths co-processor plugs in. Daughterboards for specific applications such as video and hard disk control, plug into the motherboard, sticking up at right angles to it. Next to any daughterboards (there may not be any if all functions are built into the motherboard), will be at least several slots (sockets) into which other boards plug. These are used to add the likes of enhanced graphics, additional RAM or serial ports, and internal modems and fax cards.

The sockets will either be 8-bit or 16-bit slots (ask to look inside an AT machine when you're shopping: the 8-bit slots are the ones about half the length of others, the 16-bit slots) so if you are considering adding a card, make sure it fits a free slot on your machine. Brochures and advertisements often claim something like 'eight expansion slots'; before using that in your decision making, check to see how many of these are free (unused).

The original PC offered basic functionality only; anything else had to be added on and the most efficient way of doing this is through expansion slots: thus the emphasis on 'expansion' in the IBM world. The 'others' took a different approach and tended to build everything in – the drawback here is that expansion (if it is even possible) is often not so easy.

WE'VE PUT software first, because that's when you should consider it.

□ **Operating system:** once you have decided on the particular types of applications you want to use primarily, the operating system will suggest itself. Most dealers include the operating system and a version of Basic in their basic price, but check to be sure. If you are thinking IBM, the latest version of the operating system is Dos 4.0, but about the only reason to use it is if you have a 40Mb or larger hard disk.

Most manufacturers are currently supplying Dos 3.3 which is less memory hungry and has most of the features found in 4.0. Note that for all practical purposes, MS-Dos and PC-Dos are the same. Disk Operating System – MS stands for Microsoft, the company which developed it and now grants licences to hardware suppliers to use it; these companies then supply (a sometimes slightly modified) version referred to as PC-Dos.

□ See any applications software you want to use – such as spreadsheets, wordprocessors, graphics packages and so on – running on your prospective computer, monitor and printer before finally making up your mind. Be especially careful if you're buying software that is copy protected – the software itself may be compatible with your system, but the copy-protection scheme may not be. It's a good idea if you can buy both software and hardware from the same distributor; otherwise, try to test a copy of the software you want on the dealer's machine.

□ Software manuals – if you buy Dos or any other software, you should get a real manual to accompany it. If you don't, the originals of your software may be suspect.

□ Utilities – in addition to application programs and an operating system, we strongly recommend including a set of utilities in your initial purchase. These can help you manage your files, recover from accidental formats, protect your system from the likes of viruses and make backing-up your work an almost automatic process. Many of them also include 'accessories' such as a calculator, a telephone directory, appointment scheduler and other 'personal productivity tools'; almost every dealer will have their own favorite set, so ask to see them demonstrated. After you've bought the software, don't forget to send in the registration card – registered users are usually offered upgrades to a later version of the software at much reduced prices; you may even find yourself on a mailing list for productivity and technical tips.

Shopping list for a PC

Hardware

□ A basic system will have a single floppy drive – try the applications you want to use on such a machine. If the disk swapping doesn't deter you, that might be all you need. More likely though, you'll find a dual floppy set-up will make life easier; if your applications are 'disk intensive' (that means the computer needs to write to and read the disk frequently), a hard disk is a must, since the operation is then much quicker.

If you are buying IBM, don't settle for less than 640K of RAM (we recommend 1Mb); because of their more efficient operating systems, non-IBM-type computers can often run full-blown applications with less but, depending on the programs you want to run, 1Mb of memory might still be required.

Four other items to watch for are the location of the reset button (it should be conveniently located, but not where it is likely to be pushed accidentally – if you buy a system without a reset button, you are going to spend a lot of time waiting for the system to boot up after every crash); the location of the power switch; clearly visible hard and floppy disk drive lights (these are handy 'status' indicators); and a power on light.

□ Buy the best monitor you can afford – you are going to spend a lot of time staring at it, so do the right thing by your eyes. Note that you may need a different video card than that supplied as standard with the machine you choose – so ask. Don't get a CGA (Color Graphics Adapter) monitor and card for an IBM – the resolution is abysmal and within months you'll probably be looking for an upgrade. Monochrome monitors can give better resolution for a lower price. Your choice of monitors for other-than-IBM systems will be less confusing, but the selection will still range from using a TV as a monitor to a range of higher and sharper resolution displays. Remember that monitors can either draw their power from the computer or plug directly into the mains – this can make a difference if you have limited power points. And – make sure before leaving the shop with your purchase that you have all the necessary cables. In fact, it's a good idea to ask to have your system set-up and running, including the printer, in the shop before you take it home – if the dealer thinks that's too much trouble, take your money and go elsewhere.

□ Keyboard – in the non-IBM world your choice will be limited, but try a number of

keyboards for 'feel'. IBM keyboards come in two varieties: the 'standard' 84-key PC keyboard with the function keys down the left side, and the 'enhanced' AT-style 101-key model with the function keys across the top and additional keys between the alphabetic keys and the numeric keypad. There are variations on these standards though – avoid keyboards with small Control and Enter keys or with these keys *not* located in line with the ASD ... JKL keys. Insist on keyboard lights for Caps and Num Lock.

□ The best time to buy a printer is when you buy your system. A dot matrix printer will probably suit your needs – these are available in variations ranging from basic 9-pin models up to 48-pin ones with prices and quality to match. If you think you might need color printing at some stage, check that the printer you chose has such an option. Laser printers, ink-jets and thermal printers are best-suited for speciality applications, particularly those needing high-resolution or color graphics. While the latest inkjet printers are still quite slow, they offer a good compromise between color, price and quality.

If you chose a dot matrix printer, try it before taking it home – some can be quite noisy. For printing speed, go for at least 180 characters per second (cps) in draft (lower quality) mode and about 100 cps in NLO (Near Letter Quality) mode. A tractor feed mechanism for the printer will let you use continuous paper – many printers already have a tractor feed built-in, for others, it's an option. If you need to produce many letters, envelopes, or other single-sheet documents, you may want to invest in a cut-sheet feeder. However, it is possible to get high-quality tractor-feed paper with clean edges which makes a sheet feeder unnecessary in most cases.

□ Cables – the most common frustration new users face is getting the system unpacked and then discovering that an essential cable is missing – some brands of printers don't include the cable in the price, so ask. Check whether the printer you chose is a serial or parallel type and that the cable matches the port on your computer – you might need a 'gender bender', a connector that changes female plugs to male and vice versa.

□ User guide and hardware manuals – you should get a guide to tell you how to get your computer up and running, and you should also get manuals for your printer, monitor, any add-on cards, and any other peripherals.

Extras and on-goings

□ Floppy disks are going to be a necessity, both for transferring data to and from your computer and for backing-up. Don't scrimp on these – for 5 1/4 inch floppy drives, a minimum of three boxes of 10 will be needed to start with. Remember that IBM PC XT drives can only put 360K of data on a disk while ATs can put 1.2Mb on high-density disks and 720K on low-density ones, so you will need fewer disks to store the same amount of data. The smaller 3 1/2 inch floppies (which are actually hard plastic) can hold more data, so you will need proportionately fewer. In very short order, you will find yourself with a diverse collection of disks, so a floppy disk storage box will help keep you organised and protect your disks from the likes of cigarette ash and coffee cups.

□ Box of continuous printer paper for the printer – you can get various qualities, from crumby stuff to good bond paper – check how clean the edge is when you strip off the tractor feed holes.

□ Printer ribbons – find out the printing life of your particular printer's ribbons, and the replacement costs *before* buying – some ribbons cost as much as \$70 to replace, while others sell for under \$10. Buy extra ribbons to take home with your printer because it's certain that your ribbon will only run out late at night when you are trying to finish an urgent job (and a box of them will most likely attract a discount).

□ Warranty – you should be able to get a 12-month warranty on all your equipment – computer, monitor and printer. Check what it covers – do you have to return the computer to the dealer for service or is on-site service included or available; ask how long the average problem takes to fix.

□ Service contract – when your warranty expires, it is worth investing in a service contract. Check whether your computer dealer can offer one, and check the various independent service companies to see if they'll provide a contract on your machine and compare prices. Contract terms differ widely and so does the standard of service (and length of time it takes to fix the problem). Before signing, try to talk to someone who has already had experience with the service company. If the service contract price seems too steep, check the hourly rate charged by service companies and/or your supplier. A service contract is like any insurance cover – you may prefer the risk of not having a contract.

Behind the display

MANY USERS – new and old – choose a color or monochrome monitor on price alone. The choice is more complex than that, though. If you read the 'The benefits of GUI' in our August issue, and noted the increased productivity of graphic interface users over those with a character-based interface, consider that similar increases can be expected with a color display when compared to a monochrome one. Although the research in that article was directed at discovering the differences in operator efficiency when commands had to be typed in (a character-based interface) and when an icon representing a command was pointed at with the mouse (a graphical user interface – GUI), it was apparent that color played a part in the increased productivity.

Simply put, the use of different colors to highlight choices in a menu, say, makes decision making quicker. This leads to increased confidence, which gives greater productivity more quickly. Also, even basic color systems are easier to read because of their greater resolution. Combining these two factors gives an argument that the several hundred (at most) dollars difference between a color and monochrome system is hard-pressed to win. (Besides, who wants to play games in monochrome? And – we recommend buying at least two games at the same time as the computer. During the breaking in period, which is often fraught with late-night frustration, it's a relief to take a break and have something fun to do, while still using the computer.)

However, if the budget is tight, money can be saved here. If you are only likely to use the computer for straight text work such as wordprocessing, database manipulation or spreadsheets, a good monochrome monitor will suffice. However, remember that when you are buying a complete system, you have more 'purchasing power' than than you will have when shopping for add-ons like a color monitor later – it makes sense to buy whatever you think you'll need within the next 12 months in one go.

It's for this reason that we recommend a hard disk to anyone contemplating using the computer to run a business. The numbers are fairly straightforward: a twin-floppy color XT can be bought for \$1200; the same machine with a single floppy and a 20Mb hard disk is \$1400; to add the hard disk later will cost around \$500 because a controller card for the hard disk is also needed. The amount of time a hard

disk will save is difficult to explain to anyone who hasn't used a floppy drive, but there's an analogy that makes the point.

Say you decided to work on your car one Saturday morning: the tools are kept in the basement. Rather than taking the toolbox to the car each time you wanted a tool, you had to fetch it from the basement, returning the one you'd finished with. Now, that's 'inefficient', but that's essentially what happens many times with a floppy-only computer. A great deal of time is spent on the mundane task of fetching tools (changing floppy disks) – it's so much better to have everything on a hard disk, right at hand.

If you find a single application that does what you need it to, ask to have it demonstrated on a floppy-only computer – if the disk-swapping doesn't seem too arduous, fine.

Back to monitors. When you are asking about monitors, the jargon is likely to fly thick and fast. Most of it will relate to the type of video board (adapter) you want to drive it. In almost all PCs there is no circuitry on the motherboard to drive a monitor, and the first essential expansion board is the video board. IBM has, over the last few years, defined several video standards. Many other manufacturers make video boards and monitors to the

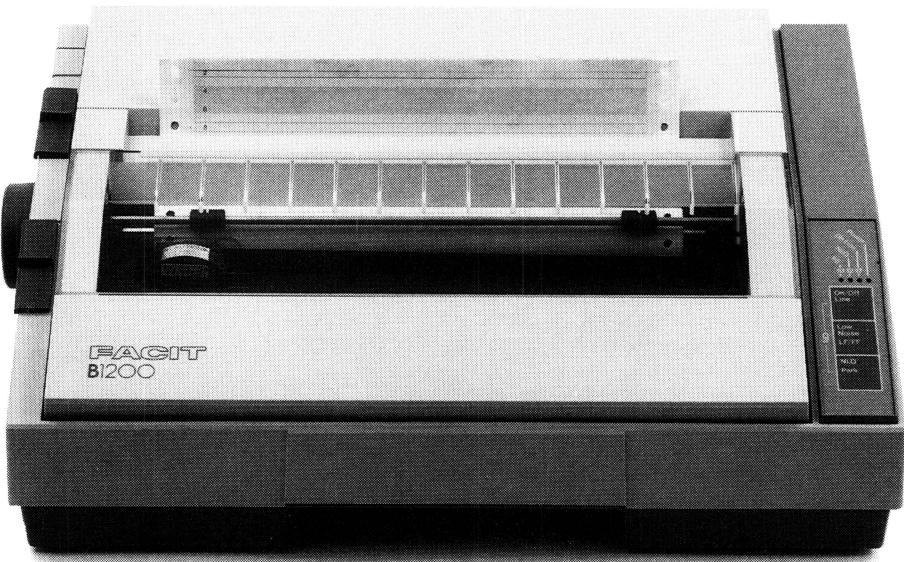
IBM standards, and some have also developed video configurations of their own.

The most common video standards are IBM's Monochrome Display Adapter (MDA), Color Graphics Adapter (CGA), Enhanced Graphics Adapter (EGA), Multi Color Graphics Array (MCGA) and Video Graphics Array (VGA), together with the Hercules Graphics Card (HGC or MGA) standards. IBM's original boards were the MDA and CGA, with the MDA offering high-resolution text (without graphics) on a specialised monochrome screen. (It's only in the IBM world that such a collection of 'standards' exist.)

For a detailed explanation of the terms and concepts, see 'Monitors in Focus' – part one appeared in our August issue, and the second part is in this issue.

Memory

ANOTHER AREA that frequently causes confusion is memory. There are three types of memory in a computer: ROM (read only memory – it needn't concern us here, since it won't generally come into the purchase decision), RAM (random access memory, which it is important) and 'magnetic media' such as floppy and hard disks, and tape drives. All software requires a certain amount of RAM to run. A standard XT is usually fitted with 640K of



The time to buy a printer is when you buy a PC – your bargaining power is at its greatest. Many businesses that don't rely heavily on letter writing find that a basic 9-pin, narrow (9-inch) carriage, dot matrix printer like the Facit B1200 is all that's needed – it can print up to 20 characters per inch (cpi) which eliminates the need for a wide (15-inch) carriage in most applications, and has a Near Letter Quality (NLQ) speed of 24 characters per second (cps). The distributor, Elmeasco Instruments, backs it with a 12-month warranty. It's priced under \$500.

RAM (or memory, as it's often called). Now, after the operating system – just another program, really – is loaded, there might be 300K of that left. So, on this machine, you cannot run software that needs more than 300K of RAM, or a combination of software that needs more than that at one time. Software today tends to be quite full-featured, but that also means that it needs a fair whack of RAM to show off those features, and 300K isn't much. As noted above, we recommend a minimum of 1Mb – it will probably be needed and this is the time to buy it.

RAM (also 'conventional memory'), extended memory, expansion memory – this area is probably one of the most confusing to users. For an overview of computer memory, see Stewart Fist's 'Extended, expanded ...' in our July issue. For a more technical explanation, the first of a two part series, 'IBM memory management', starts in this issue.

Memory is the main reason you should determine the software you are going to be using before buying a computer – there are few things more frustrating than buying a software package that's all you've been looking for, only to get a 'not enough memory to run this application' error message when you fire it up.

At some stage, every user needs to connect external devices (peripherals) to their computer whether it's a printer, a mouse or modem. These are connected by plugging cables into ports, which are sockets on the rear edge of an expansion card, poking out through the opening in the rear panel. The most common configuration in an IBM-type computer is one parallel and two serial ports. At this stage, never mind what 'serial' and 'parallel' mean, just remember that you will most likely need a parallel port for a printer (although some use a serial port), while serial ports are used for modems, mouses and a variety of other external devices. The one/two combination is most probably all you'll need to begin with; there are quite inexpensive boards with additional serial ports that can be added if you need them later.

Often the serial and parallel ports will be on the same expansion card along with other functions like memory and the clock/calendar. These combination boards will be called multi-function or multi-I/O boards, but what is on them will vary from one to the next.

A battery-backed clock/calendar is a nicety that shouldn't be overlooked when shopping; without it, the computer will



A full set of LEDs (light emitting diodes) makes life easier, particularly for new users. The Deltacom 286-Turbo (and companions in the range) have status lights for power on, turbo (12MHz) on and hard disk access located on the front of the cabinet; the keyboard has LEDs for Num Lock (which changes the keypad to the far right from arrow keys to numbers), Caps Lock and Scroll Lock (which is used to start and stop documents 'scrolling' across the screen). Note the Reset Button (top left of the cabinet) and the Power switch (top right) – both are located where they are easily reached, rather than around the back.

forget the time and date whenever it's powered down (shut off); if you want these to be correct while using the machine, it will be necessary to reset them at each start up. Since many software packages read the date from the operating system, and a file's creation date can be a handy check on which is the latest version of a file, it's worth the added expense (if any) to have the date right without user intervention. Even more importantly, many backup utilities can be configured to backup only those files changed since the time/date of the previous backup – this can save a great deal of time and some expense since less backup media is used.

If you think you've found a bargain, but it doesn't have a battery-backed clock,

add-on boards with a battery and clock can be had for around \$100.

Drive it!

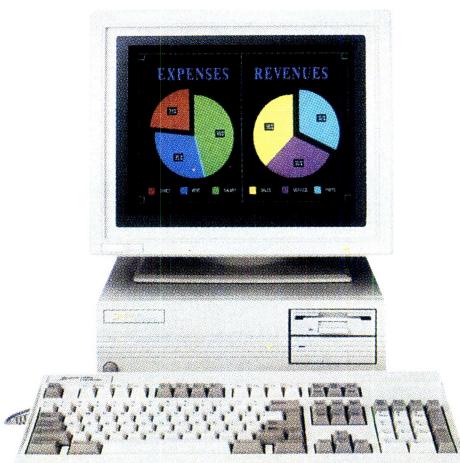
ANOTHER MAJOR choice you may be presented with is in floppy disk drives. The original IBM floppy disk drive had a front panel 150mm wide and 90mm high, and drives that fit into a slot this size are called 'full-height'. Over the years, more compact drives have been developed; typically, these are still 150mm wide but only 45mm high, and are called 'half-height'. It is essential that any PC has space to fit at least two half-height drives, and the ability to fit three or four is strongly recommended.

What drives should you fit? Most XT

and AT machines being sold at the moment have 5.25-inch (135mm) drives, and 80386-based machines are usually fitted with a 3.5-inch (90mm) drive – but the overall trend is towards the smaller drives. If you are given a choice, take the larger drive since it will probably be cheaper and there is still a lot of software that is only supplied on disks this size. Note that because of the disk design, 5.25-inch disks hold less (360K or 1.2Mb) than 3.5-inch disks (720K or 1.44Mb), but they are cheaper. Ask about the disk controller, it could be important if you decide to add a floppy drive or change hard drives: Is it built into the motherboard? Can it control floppy drives only, or a hard disk, too? Disk controllers can add half to the price of a drive, so make sure the computer has what you are likely to need later.

Software

A COMPUTER without software is useless. The most common software needs are a wordprocessor, database and spreadsheet. There are a number of integrated packages that supply all of these as one 'suite', or offer various other application



Zenith's Z-286LP is an example of the type of system we recommend for businesses at the 'entry' to computing. Priced around \$5000, the system runs on a 12MHz 80286 and is fitted with 1Mb of RAM, a 40Mb hard disk and VGA display. Like any manufacturer with faith in its products, Zenith warranties its computers for 12 months.

mixes. If it suits your needs (or several of them) these can be good value, not only in dollar terms, but in ease of learning since the applications will share a similar 'user interface' – that's jargon for how a program looks when you are using it and the actions necessary to accomplish tasks like entering data and saving files. These can include various key combinations, commands and different ways of using a mouse, some of which you will quickly discover are almost intuitive, while others will never seem natural.

Many suppliers bundle a selection of software with computer systems, so keep that in mind when shopping around – it could save some money if it's the software you need. If it's not, ask for a different bundle with the same total price – while many dealers aren't able to do that, some can. If you buy a collection of packages from different software manufacturers, check how compatible they are – can your spreadsheet accept data from your database, for example?

When you have decided to buy a PC, remember that there will be a few necessary extras. Initially, you may be able to

Loanstar to

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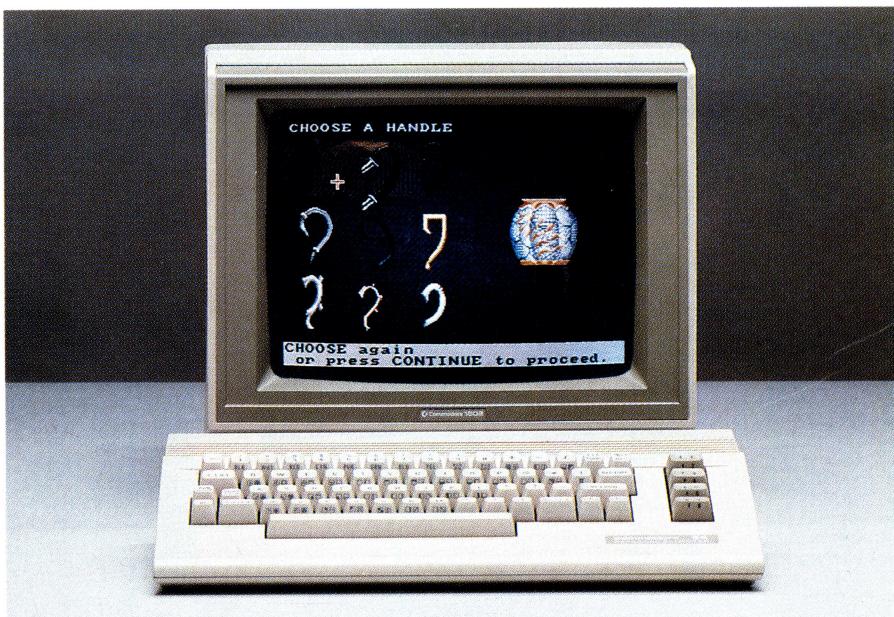
Star are the world's largest specialist computer printer company, and can supply models suited to any profession.

avoid buying a printer, but, inevitably, you will find you need one. Good quality dot matrix printers are now under \$500 and others can be had for \$300 – they might not give 'letter quality', but the results are perfectly adequate for many uses. When you buy that printer, make sure that you get a cable to suit. (For more information on printers, see our March and April issues.)

Even without the printer, you will need some disks, and less than around 30 won't be enough, besides, buying disks a hundred at a time will often attract a discount. Paper and ribbons for the printer will be needed. A box of paper will cost between \$50 and \$80, and you should always have one spare in addition to the one in use. Ribbons always wear out at the wrong time, so have at least one spare – at around \$15 each for most printers, the expense is not too great. Before settling on a printer, ask about the cost of replacement ribbons: it can be as much as \$70.

Hard-where?

ARMED WITH a list of your needs (don't worry if they seem vague to begin with, as



Commodore's Amiga range has a reputation as 'fun machines', but there is a serious side to them, particularly where fast, quality graphics and sound are needed. The display shown on the monitor is from the design exhibit at Sydney's Powerhouse museum, which uses a number of Amigas in interactive exhibits.

Rockstar

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FEATURE: ENTRY LEVEL PCS

While we generally recommend a hard disk, savings can be made by opting for a twin floppy system. For example, Dick Smith's Acer PC-500+ with two floppy drives is priced at \$1195, while it's \$1595 with a 20Mb hard disk and one floppy drive (both include a 12-month warranty and monochrome monitor, however, a color monitor will cost an extra \$300). Before settling on a machine without a hard disk, try the software you'll be using on it – with some packages, disk swapping is a frustrating nuisance.

you look around, you'll soon tighten them up and fill in the details), look through the ads in the magazine, your local Yellow Pages, and the computer sections of local newspapers. To get a feel for things computer-ish, spend time in a newsagency with a good selection of computer magazines – beware though, that most of these magazines are from overseas and the information in them is usually out of date and not relevant to Australia. That aside, they are still an excellent source of general information on the capabilities of the various machines, particularly those with the proprietary operating systems mentioned earlier, and of the range of software available.

You should then be able to draw up a short list of software that meets your specifications and of the hardware that can run the software. Now, go back to three or four computer stores – the bigger, the better. While you might get a better price and more personal after sales service from one of the smaller retailers, while you are shopping around, you want to be able to see the largest range of products you can – so, visit the big dealers and once you have made your decisions, also approach two or three smaller dealers and ask them to quote on a system.

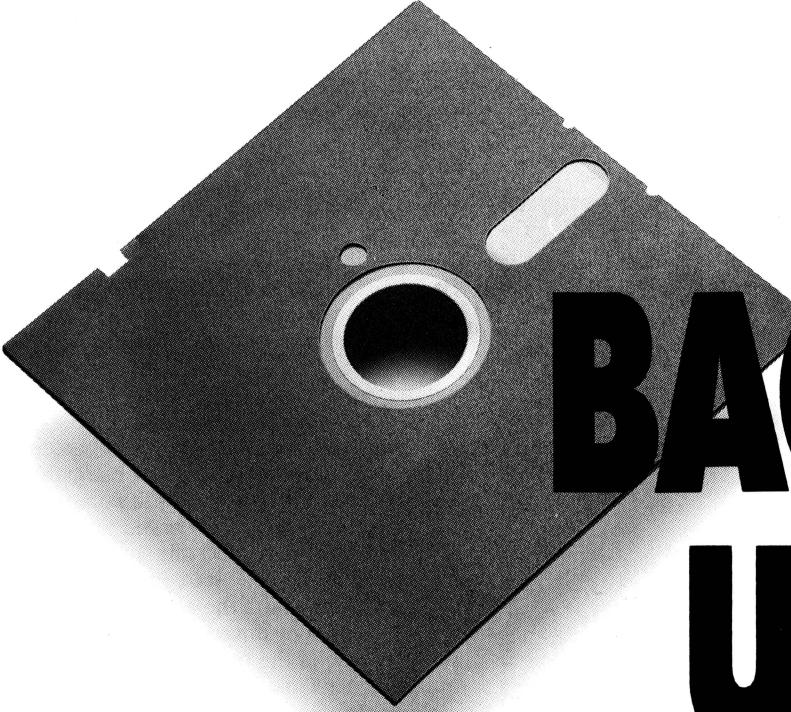
Before proceeding any further, it's time to talk to your accountant. Buying isn't the only option: like cars, systems can be rented or leased. There are also a number of other areas that an accountant can advise on to make sure you get the maximum return from your investment. In fact, if you lack confidence, it's a good idea to get your accountant involved right from the start.

More helpful advice can be found at local User Group meetings – we can't stress enough what a valuable source of information and expertise these groups are. Everyone there will have been a new user at one time or another and you'll probably hear a number of tales of the pitfalls to be avoided – you'll soon learn who the good and bad companies to deal with are. User Groups generally advertise meeting times in local papers and dealers often know about the local groups.

Initially, you might even want to take a computer-literate friend or business associate along when you are visiting dealers. (For an interesting viewpoint, see a letter headed 'Fair go for dealers' in 'Write Bytes'.)

Don't rush your decision – take your time, compare prices, quality and advice. Let things stew for a few weeks and then think about the choices you want to make again – if you are feeling confident, it's time to move.

Motherboards, 32-bit, HGC, megabytes – it all sounds unfathomable to newcomers. But don't be daunted: the only way to learn is to start asking questions and having a look around. A PC system can represent a sizable investment. Take your time, ask even the dumbest sounding questions (walk away from condescending replies), don't just look at computers from different manufacturers and the software that runs on them – *try them!* Small things like the feel of the keyboard and presentation of software error messages will make a difference to how happy you'll be with your purchase in six months. □



BACKING- UP

DS BACKUP, FASTBACK AND SITBACK

If your business depends on computers, backing-up is an essential task – but often neglected because it's a 'nuisance'. John Hepworth tells of three programs that make it easy . . .

SOONER OR later your hard disk will crash, critical files will be erased by mistake, your computer will be stolen, or some accident will destroy it. How will you get back that critical accounting data, that doctoral thesis, or those records you need for the tax commissioner?

If you have up-to-date backups, just restore a few files. The problem is that backups are usually tedious and inconvenient, and a few people actually backup as often as they should. Without a backup, the effects on your business could be fatal. What's needed is a fast and easy backup program. Tape backup is usually the most convenient, but requires a fairly hefty investment in hardware for each machine in your system, and therefore, most users will elect to backup to a disk instead of investing in a tape drive.

Backup, Restore and Xcopy are three Dos utility programs that can backup and restore files. There are a host of third party backup programs that can be also used such as the renowned Fastback Plus and DS Backup Plus. Both are menu driven programs that backup to floppies in the minimum possible time. Then, there is SitBack, a TSR that takes a mere 15K of memory and it backs up files to a floppy every time those files are changed, without interrupting the use of any other program.

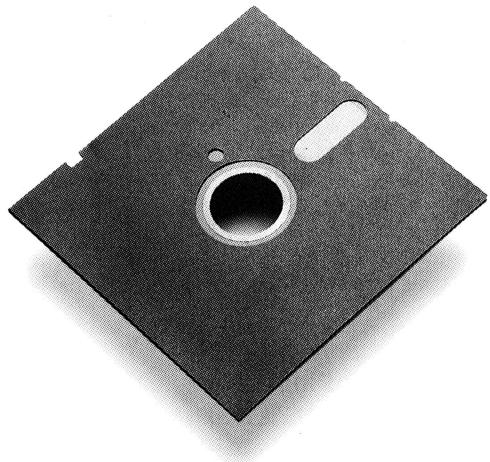
Types of backup

ALL BACKUP programs allow the user to specify the drive and directories to be backed up. Furthermore, they all allow a selection of files to be backed up, thus it is possible to backup all .DOC files and no .BAK files.

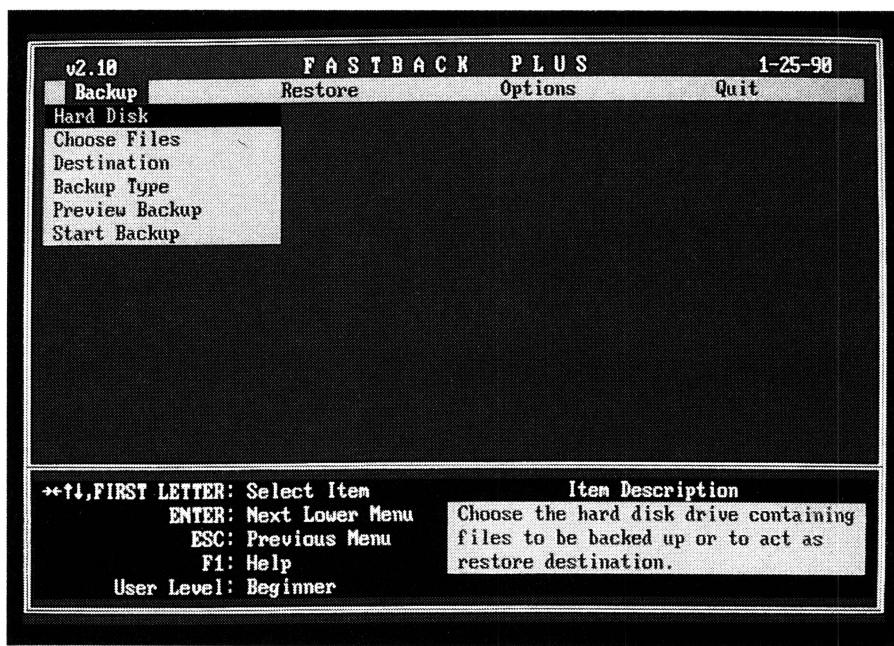
Files can be backed up in three ways. Total backup saves to a floppy all selected files. Incremental backup saves the files that have been changed since the last backup, total or incremental. Differential backup saves the files that have been changed since the last total backup. Total backups save the most files at a time, incremental backups the least, and differential backups somewhere in between.

To restore from these types of backups, first restore the last total backup. If incremental backup was used, then restore from each incremental set in turn. If differential backup was used, restore the last total backup and then the last differential backup.

The Dos Backup and Restore programs are run from the Dos prompt, with no menu system. The various options are specified on the command line, as are the



names of the files, directories, and the source and target drives. Files in the current directory, or a specified directory, can be backed-up with or without backing-up files in sub-directories. There are various options, such as only backing-up files that



With Fastback Plus v2.0, the opening screen has a ribbon menu (containing four items) across the top – each with a pull-down menu. These are Backup, Restore, Options and Quit.

have been changed since the last backup, or backing-up only the files that were changed after a specified time or date.

Dos Backup is relatively slow. It also has a disadvantage that the backup files made with different versions of Dos may have different formats. This can make it difficult, or even impossible, to backup on one machine and restore on another.

It is also possible to use Xcopy with /S and /M options to backup files. This has the advantage that the files are saved in their normal format, and in named directories on the floppy that match those on the hard disk. The disadvantage is that the process stops each time a disk fills, and must be restarted time after time from the Dos command line to complete the back-up.

Fastback Plus 2.10

FASTBACK PLUS is simply a brilliant program – it's fast, easy to use and packed with features. It has excellent menus, with different versions for beginners, intermediate and advanced users. These have many commands in common, but as the skill level is raised, additional commands and features are accessible. Fastback also has powerful macros to save a complex string of commands and automate its use.

Fastback 2.10 is not copy protected, unlike the original Fastback. Installation starts by making a backup copy of the distribution disk, then an automatic installation program takes care of creating a new directory on the hard disk and copying the necessary files. It then checks the hardware, determining the available drives for backup and DMA performance. If there are two floppy drives of equal capacity, Fastback Plus will use them both, but if they have a different capacity, such as a 360K and a 1.44Mb, then Fastback Plus defaults to using the drive with the higher capacity. Naturally, machines with a single floppy can also be used.

With Fastback Plus v2.0, the opening screen has a ribbon menu across the top. Also at the top of the screen is the name of the program, the version, and the current date. At the bottom of the screen is an area five lines high that details the key-strokes that can be used. The ribbon menu has four items, each with a pull-down menu. These are Backup, Restore, Options and Quit.

There are six items in the Backup menu. Hard Disk selects the drive to be backed up. Choose Files selects the directories and files to be backed up, with point and shoot from a tree if required. Destination selects either the floppy drive or any Dos

drive and path, which can be a network drive. Backup Type selects a Full, incremental or differential backup. Preview Backup looks through the selected drive and directories and displays a tree of the drive, and a directory by directory list of all files, with a tag next to those that will be backed up.

The final item in the Backup menu is Start Backup. This displays a new screen with three more menu items – Estimate, Start Backup and Quit. Estimate works out the number of files to be backed up, their total size in bytes, and the number of floppy disks required. Start Backup is the same, but also starts the process of backing-up. The floppy drive starts to spin, and the user inserts the first floppy. When it's full, Fastback Plus prompts for a new disk without stopping the floppy, and this process continues until the files are backed up.

Fastback uses disks with a Dos format, and if required, it formats them very quickly during the backup process. Data compression is available if desired, and can be selected to minimise either the number of disks or the time to be taken.

DS Backup Plus 2.0

DS BACKUP Plus is another menu driven backup program. Like Fastback Plus, it is not copy protected and offers optional data compression. However, unlike Fastback Plus, it uses a proprietary disk format. If disks have been formatted this way and data compression is off, it is the fastest backup available on a slow machine. If

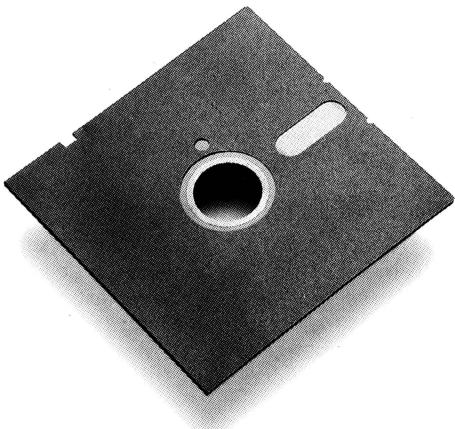
	Disks taken	Time (sec.)	Rating
Dos Backup	7	549	1.00
Xcopy /S /M	7	699	0.79
Fastback Plus 2.10 No compression	7	264	2.08
Save time	6	335	1.64
Save disks	5	354	1.55
DS Backup Plus No compression	6	233	2.36
Compression	4	1031	0.53

Table 1. As a speed test, a standard 4.77MHz XT was used – just over 4Mb of files were backed-up to 720K 3½ inch floppies. Fastback Plus and DS Backup Plus were both far faster than Dos Backup or Xcopy, except when data compression was used with DS Backup Plus.

the disks are not formatted, it is quite slow (can take about twice as long as Fastback Plus). If data compression is used it is even slower, but uses by far the fewest disks.

An installation program takes care of loading DS Backup Plus onto the hard disk. Starting DSB.EXE then displays a screen divided into several panels. The left third of the screen displays a tree of the drive, and the right two-thirds has a list of the files in the default directory. Across the top of the screen is a ribbon menu with the commands Options, Backup, Restore, Utilities and Configure. Also shown at the top is the time, the source drive, default directory and the target floppy drive. At the bottom, the number of directories, files, total size in bytes, the number of disks required and the expected time the backup will take is shown.

Like Fastback Plus, DS Backup Plus can use one or two drives, and defaults to the higher capacity drive if they are different. It also keeps the drives spinning while prompting the user to change disks. All the various menus are well laid out and intuitive, and the program as a whole is easy to use.



SitBack

SITBACK 2.02 IS a unique product. While there are many menu driven backup products, SitBack is a TSR – it sits in the background, unseen and out of the way, and waits for its opportunity. If you haven't hit a key for a defined interval (usually 120 seconds) or it is a specified time of day, SitBack goes into action. It looks into defined directories for specified files and copies them to a floppy. If a disk becomes full, a gentle beep every few seconds reminds you to put in a new disk.

Typically, a user would do a full backup with SitBack, or any other backup program, and then use SitBack to make incremental backups on to a floppy. All the files

on the floppy are kept in directories (with the same names and paths as those on the hard disk) in their original Dos format, making restoration as easy as using Dos Copy commands, though SitBack also has a restore option. One of the small difficulties is that the SitBack TSR cannot split long files that won't fit on a floppy. However, this can be overcome by manually backing up such files with a transient program that comes with SitBack.

SitBack takes a little less than 15K, and thus there is no room for menus or other trimmings. After all, a normal screen image takes 8000 bytes to store (including color information). If you had pop-up screens and menus, a lean program would turn into an obese memory-hog. But the solution is simple – use a separate transient program to set the defaults, beeps for the few messages, have commands given via Ctrl-Alt and another key, errors announced with four gentle beeps every few seconds and error messages sent to a log file.

But what do you do if you want to remove the backup disk from a drive so that you can format floppies, copy files to a floppy, or do an installation of a new program? Just press Ctrl-Alt-P to pause SitBack, and do whatever is necessary. After reinserting the backup disk, press Ctrl-Alt-G to continue.

SitBack is very useful on standalone systems with floppy drives. And, it is even better on networks, and allows automatic file backup from one machine to a drive on another.

SitBack's speed is almost irrelevant because it sits in the background and goes about its task without interfering with the use of the machine. The time it takes to use Fastback Plus, DS Backup Plus and the Dos solutions is critical, as the machine and its operator are tied up from start to finish, feeding a string of floppies into the drives. See Table I for a comparison of the three with Dos' Backup.

As a speed test, I used a standard 4.77MHz XT – just over 4Mb of files were backed-up to 720K 90mm (3½ inch) floppies. Fastback Plus and DS Backup Plus were both far faster than Dos Backup or Xcopy, except when data compression was used with DS Backup Plus. Without data compression, DS Backup Plus was slightly faster than Fastback Plus, and both were at least twice as fast as Dos Backup.

On different machines the times will vary because features like data compression take processor time, but the figures indicate the relative speeds. If you have a

faster CPU, it may speed backup considerably. Likewise, 720K drives are not noted for fast data throughput.

Conclusion

SITBACK IS excellent, and makes it easy and convenient to have backups that are absolutely up-to-date. Dos Backup and Xcopy may be the right price, but as the old proverb says, 'there is no such thing as a free lunch'. They are too slow, arcane and inconvenient. In a busy office, few people will take the time to use them.

Fastback and DS Backup Plus are both simple to use, and about twice as fast as the Dos Backup. My preference is Fastback Plus, but both are excellent ways to backup your hard disk. □

In Part 2 of our data security feature, Mark Cheeseman looks at the wide range of removable mass storage devices on the market, from tape drives to rewritable optical disks.

Product Details

Product: Fastback Plus v2.10

From: Fifth Generation Systems

Distributor: Imagineering

77 Dunning Ave,

Rosebery 2018 NSW

(02) 697 8666

Price: \$328 rrp

Fastback Plus is simply a brilliant program – it's fast, easy to use and packed with features.

Product: DS Backup Plus

From: DS Technologies

Distributor: Software Wholesalers

8 West St,

North Sydney 2060 NSW

(02) 957 6686

Price: \$195 rrp

[DS Backup Plus] uses a proprietary disk format. If disks have been formatted this way and data compression is off, it is the fastest backup available on a slow machine.

Product: SitBack 2.02

From: SitBack Technologies

Distributor: Logo

91-93 Old Pittwater Rd,

Brookvale 2100 NSW

(02) 819 6811

Price: \$169 rrp

SitBack is excellent, and makes it easy and convenient to have backups that are absolutely up-to-date.

IBM MEMORY MANAGEMENT

FOR ALMOST A decade the limit to the amount of memory on Dos-based computers (better known as IBM compatibles) has been 640K. The world is currently in the process of breaking through that barrier, and once through, the sky's the limit. But, breaking through this barrier is not a quick or painless process. The success of the IBM personal computer and MS-Dos has meant an enormous investment in capital equipment, skills, time, and money for a huge range of companies, not the least of which are the hardware and software manufacturers themselves. Such a large section of the business world cannot make the radical alterations in technology required overnight. Industry insiders expect the transition to take until the late 1990s, if not longer. During this period, the technology and software will continuously change and improve. Unfortunately, for the user, different manufacturers will make the change at different speeds and while this is happening, not everything will be compatible.

The major reason for having more than 640K of memory is to allow multitasking – this permits an exponential increase in productivity and allows a sophisticated exchange of information between applications. Multitasking requires that a group of programs share the same memory – this means that they must all obey the same rules, so that no program interferes with the operation of another.

Any PC owner who attempts to get more than 640K of memory out of their computer has entered the realm of frontier technology. It is very easy in today's market to advance more rapidly than many manufacturers. When a user does so, he is effectively conducting original research in the computer field. There are no books on the subject of memory management because it's so new and no-one has worked out all, or even most, of the answers. In most cases there are not even any general rules – almost every computer is a unique case. The only solution is for users to diagnose their problems, and work out their own solutions. This article attempts to provide the basic knowledge required

Our feature on memory in May drew a number of requests from readers – and dealers! – for more, so we asked Brandt Dainow to expand on memory. This month he covers Dos memory management and the development of the current standards – next month, Windows memory management.

to understand what IBM memory management is all about. With this knowledge, it should be possible to make informed purchase decisions, to understand new developments in the field as they occur, and solve problems as they arise.

Memory terminology

THERE ARE THREE types of memory possible in a PC: conventional, extended, and expanded. Conventional memory is present in every computer, extended is usually found on '386 machines, while expanded may be present on any machine.

Conventional memory is the first 640K of memory. All versions of Dos, and most machines prior to the 80286 generation, can access only 640K of memory. This is a limitation which cannot be overcome in Dos – it is fundamental to its operation.

The adapter segment is the area from 640K to 1024K, or from A000 to FFFF in hexadecimal notation. This area is reserved by Dos for the computer's use (for things like ROM, video memory and so forth). However, it is not considered memory for most purposes. A computer which has 1Mb of memory actually has 1408K of address space, 1Mb plus the

384K adapter segment. But, most computers don't use the entire 384K of the adapter segment.

Extended memory is simply a direct continuation of the first megabyte of address space – the area from 1024K onward. It is called extended memory because it extends beyond 1Mb. This memory is used by the 80286 and 80386 machines in protected mode under operating systems like OS/2, and by Windows 3 in standard and enhanced modes. Earlier versions of Windows convert it into expanded memory.

Memory which physically lies outside the first 1Mb of memory, but which an application thinks lies inside the first 1Mb is called expanded memory. This is so because it expands the first 1Mb of memory into the regions beyond. How this is done is mainly what this area of technology is all about. On most 80286 and earlier machines, this requires special bank-switching circuitry (found in expanded memory cards like Intel's AboveBoard and AST's RAMPage). The 80386 chip includes these management functions.

Expanded memory specifications

A NUMBER OF companies have worked together over the past few years to design some specifications of how extended memory is to be accessed (that is, turned into expanded memory). The specifications they produced are blue-prints of how this is to be done. The actual process of doing it is an implementation and is performed by a device driver.

In 1985, Lotus, Intel, and Microsoft joined forces to find a way to allow software to access memory in excess of 1Mb. They produced Lotus Intel Microsoft Expanded Memory System (or LIM EMS) 3.2.

This system worked by establishing a special 64K zone in memory, technically referred to as a page frame. The page frame sits in the adapter segment and is divided into four 16K sections. Each of these 16K sections can be switched to connect to different sections of the physical memory (via bank-switching). Thus a program can think it is accessing an area of adapter segment memory when in actual fact it is being re-routed to an area of

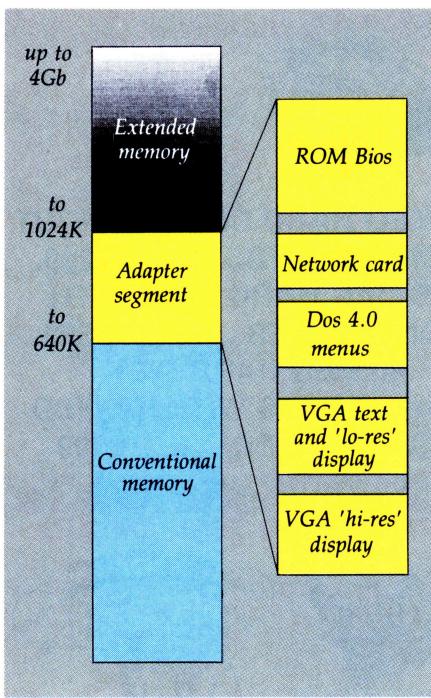


Figure 1. A PC can have three types of memory: conventional, extended and expanded. Conventional memory is the first 640K. The adapter segment is the area from 640K to 1024K and is reserved by DOS for use by ROM, video memory and so forth – it is not generally considered ‘memory’; the ‘blank’ spaces here can be used as physical pages. Extended memory is a continuation of the first megabyte of address space – it is used in protected mode under operating systems like OS/2, and by Windows 3 in standard and enhanced modes. Memory physically outside the first 1Mb which an application thinks lies inside that first 1Mb, is called expanded memory – on most 80286 and earlier machines, this requires special bank-switching circuitry, while the 80386 chip includes these management functions.

memory outside it. Each of the 16K areas in the page frame is called a physical page, and each of the 16K memory areas in extended memory it links to is called a logical page. When more memory is required, the physical page is simply linked to a different logical page frame. These two page frames, working together, effectively form a single page of expanded memory.

The page frame system turned out to be unsuitable for accessing program code (even though it worked well for data), so the Enhanced Expanded Memory Specification (EEMS) was developed by AST Research. This allowed page frames greater

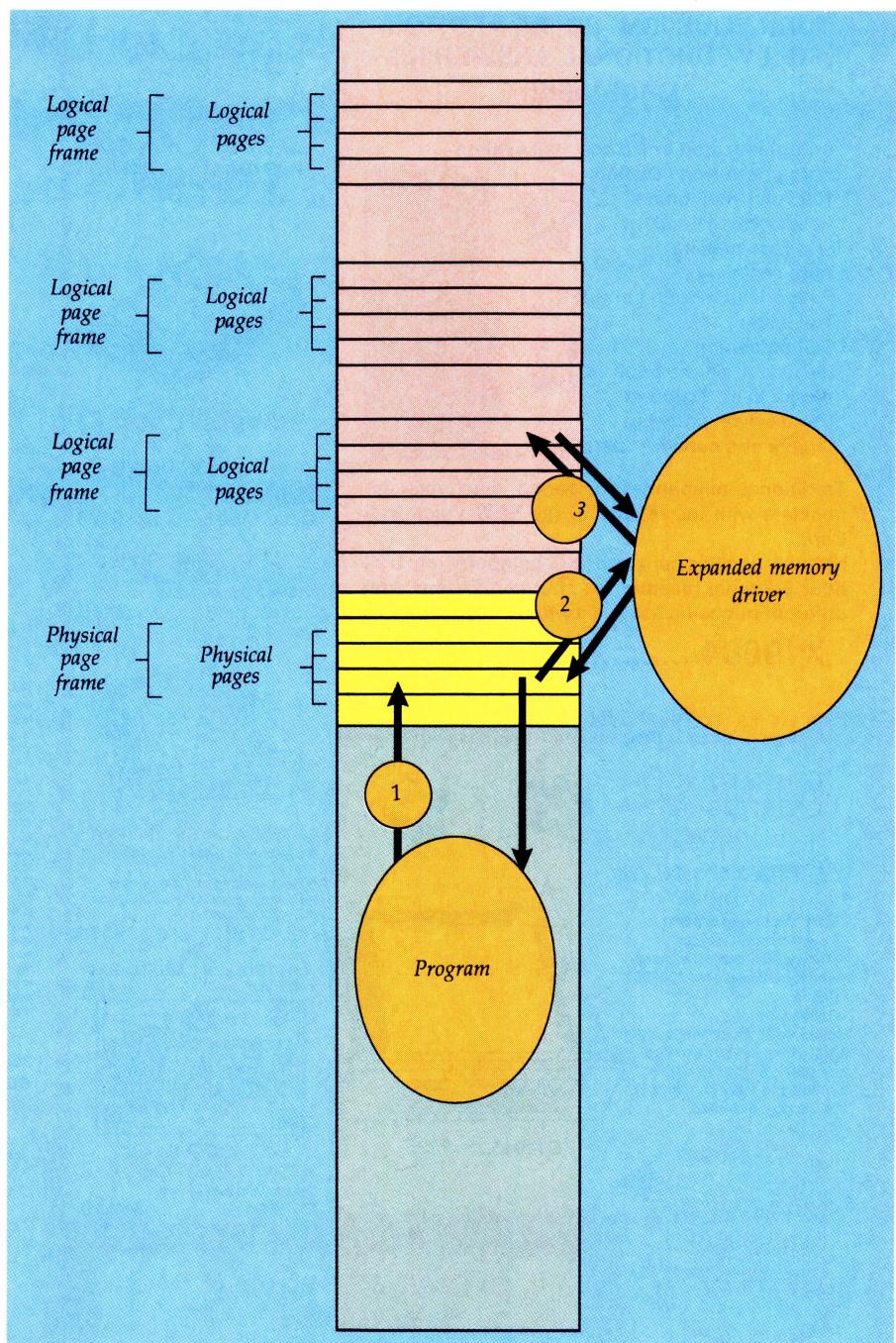
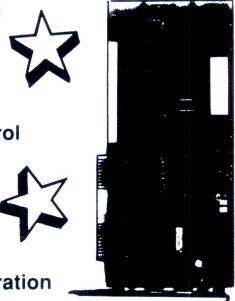


Figure 2. LIM EMS 3.2 is a blue-print for turning extended memory into expanded memory. The system establishes a special 64K zone in the adapter segment, the page frame. The page frame is divided into four 16K sections (called physical pages) – these are also the ‘banks’ of memory – each of which can be bank-switched to connect to different 16K sections of the physical memory. The two 16K memory areas work together to form a single page of expanded memory. For example: when a program in conventional memory calls a physical page frame in the adapter segment (1) looking for data, the expanded memory driver detects the call (2) and re-routes it to the appropriate logical page frame in extended memory (3) the requested data is then delivered to the program. LIM 4.0 allows page frames to be larger than four pages and the frame can be anywhere in the first megabyte, rather than only in the adapter segment.

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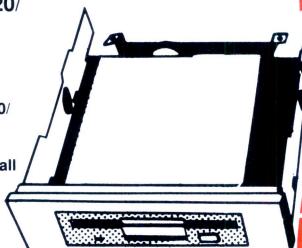
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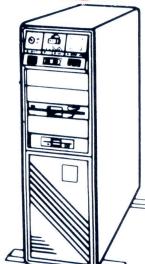
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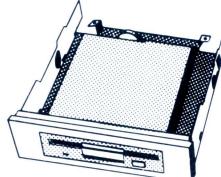
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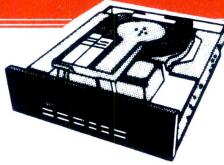
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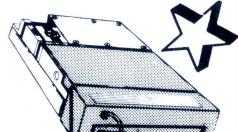
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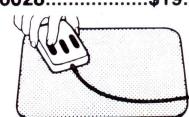
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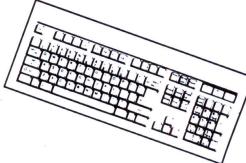
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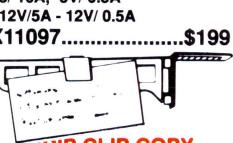
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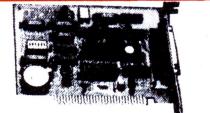
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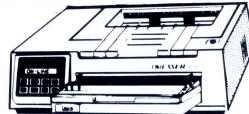
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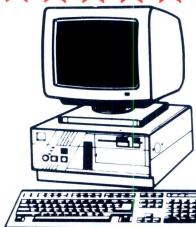
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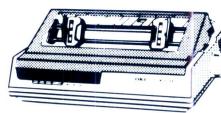
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than four pages, and permitted the page frame to be located anywhere in the first 1Mb, rather than confining it to the adapter segment. EEMS required special hardware and was not popular, but it did mean that for several years there were two competing standards, EMS and EEMS.

EMS had another limitation in that once a program had taken over a section of memory, there was no way to change the size of that section. As a result, programs took the largest amount of memory they could lay their hands on, just in case they needed it later.

In 1987, Lotus, Intel, AST, and Microsoft got together and produced EMS 4.0, a fusion of EMS 3.2 and EEMS. EMS 4.0 is now the only expanded memory specification. In addition to fixing the above problems, it also allows access to 32Mb.

With this knowledge, it should be possible to make informed purchase decisions, to understand new developments in the field as they occur, and solve problems as they arise.

If a user is only running one application at a time, they will see no difference in performance between EMS 3.2 and 4.0. The difference is only apparent when running multiple programs which use a great deal of memory.

On an 80286 computer, expanded memory requires special circuitry. Some manufacturers, such as AST and Hewlett-Packard, build this circuitry into their machines (as does IBM on the 80286 PS/2). Most computers (including the IBM AT and Compaq's DeskPro '286) require special expanded memory boards. Each expanded memory board requires its own operating software, called a device driver—one board's software will not work with another's.

LIMulators

WITH THE introduction of the 80386 chip, there was no longer any need for special circuitry to access expanded memory be-

cause the chip contained the necessary memory management techniques. All that was required was a device driver to change extended memory into expanded. Because these device drivers copy the mode of operation of the EMS system, but operate in a different hardware environment, they are said to 'simulate' LIM EMS 3.2 or 4.0, and are thus called LIMulators. There is little difference in performance between a normal 80386 chip with a LIMulator and an 80286 with special hardware.

As in everything else in the computer industry, the transformation of what had been extraordinary performance into standard performance meant that programmers could push the whole field one step further. Thus, most LIMulators do more than just emulate LIM 3.2 or 4.0.

One of the more common features is the ability to store the LIMulator code itself in extended memory. This means the size of the program has little, if any, impact on how much conventional memory is used. For example, the 386MAX.SYS is over 64K long, but only uses 2.5K of space below the 640K mark.

Another handy feature of some LIMula-

tors (such as CEMM.SYS on the Compaq '386) is that they can transfer the contents of ROM into RAM. The 80386 is a 32-bit computer, but most expansion devices on the market (such as EGA cards and network adapters) are designed for the 16-bit 80286 or the 8-bit 8088. This means the 80386 chip has to slow itself down dramatically to wait while the card accesses its slow 8- or 16-bit ROM. If the LIMulator copies the contents of the card's ROM into 32-bit RAM, the devices operate faster, and don't have to slow the whole system down. The disadvantage of such techniques is that they often lead to memory conflicts, particularly if the LIMulator itself doesn't fully respect the EMS specifications (as many do not).

The other major feature of LIMulator advances is the ability to load Terminate-and-Stay-Resident (TSR) programs into the unused adapter segment memory. Normally, TSRs use conventional memory, thus reducing the amount of memory available for other software. The reason this relocation is possible is because it is quite common for memory to be reserved without being used. On IBMs, for example,

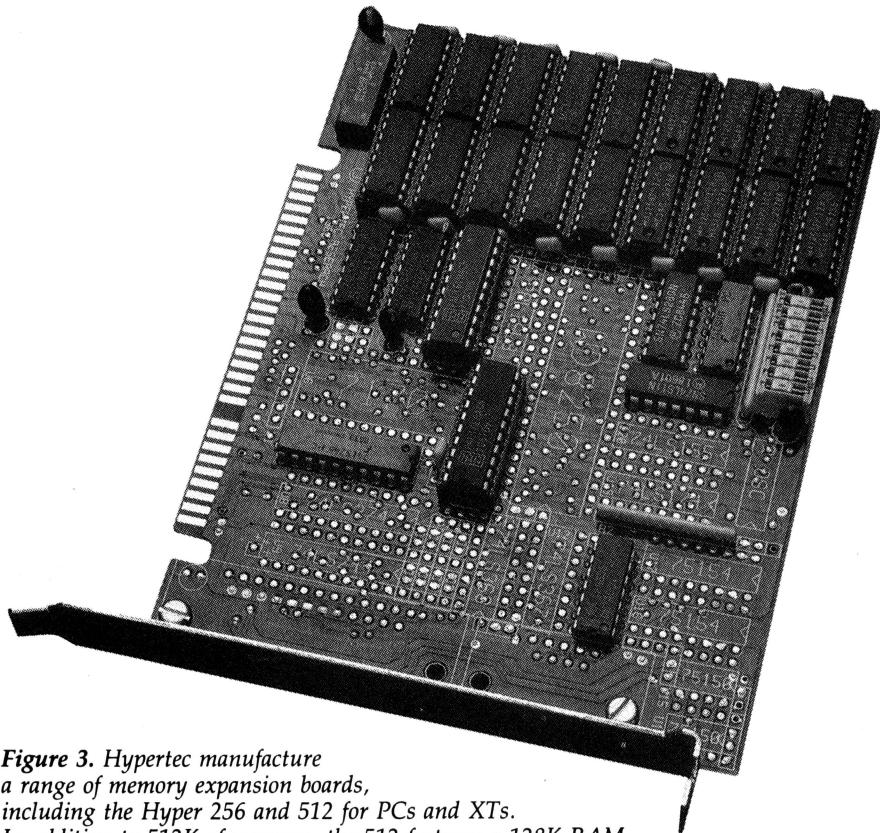


Figure 3. Hypertec manufacture a range of memory expansion boards, including the Hyper 256 and 512 for PCs and XT's. In addition to 512K of memory, the 512 features a 128K RAM disk option, disk caching and print spooling utilities. The company also designs and manufactures memory expansion boards for ATs, '386s and MCA PS/2s.

32K of adapter segment memory is reserved for running a monochrome adapter, but if you run a color monitor, this memory is unused. (386MAX is a specific example of a LIMulator with this feature.)

There have been attempts to implement expanded memory emulation via software on the 80286. These LIMulators are not highly regarded in the computer industry, the predominant attitude being that expanded memory on the 80286 really does require special hardware.

Extended memory specification (XMS)

THE FIRST 64K of memory beyond 1024K is called the High Memory Area (HMA). Microsoft found a hardware trick involving manipulating address lines which could enable the 80286 and 80386 chips to access this area – previously, this was not considered possible. The specifications laid down for successfully performing access to HMA are called the EXtended Memory Specification, or XMS. The first implementation of XMS was HIMEM.SYS, which appeared with Windows 2.10.

Software will not automatically utilise HMA, it must be designed to do so. Windows, for example, loads sections of itself into this area (including the menu system), saving up to 60K of conventional memory. One of the first Dos XMS programs was VDISK.SYS, an IBM RAM disk device driver included with the more recent versions of PC Dos. VDISK defined extended memory access and allocation methods which some other LIMulators have since copied (386MAX being a notable exception). However, Microsoft's XMS scheme describes implementation methods which are largely incompatible with VDISK.

Accessing HMA is only one feature of XMS. The complete specification defines an interface for accessing all areas of extended memory. This means software working in an 80286 environment which has no expanded memory hardware can still have additional memory if they observe the XMS specifications. Of course, using XMS to access extended memory is still noticeably slower than accessing expanded memory with dedicated hardware.

Windows provides a variegated memory management environment for applications by facilitating EMS 4.0 performance wherever possible, but attempting to provide applications with an EMS 3.2 environment if they need it. Applications need such an environment whenever they require 64K of contiguous memory to form a

unified page frame (usually for accessing large amounts of data). Note: the discussion here relates to all versions of Windows before 3.0; in the next article in this series, we'll cover Windows 3.0's technique for memory management.

Windows 286 and 386 divide memory into two categories: bankable and non-bankable. Non-bankable memory contains items which cannot be moved around such as Dos, device drivers, system ROM, and most of Windows itself. Windows also maintains a section of non-bankable memory called Windows Shareable Memory.

Windows applications require shareable memory in order to communicate with each other. In this respect, shareable memory is a common area for all applications. As a result, it is often a very scarce and valuable resource. This is the reason why it is possible to get 'out of memory' errors, even when there are large amounts of Extended or Expanded memory available – the system has exhausted its supply of shareable memory. One process which causes every application to use shareable memory is printing. Because all Windows applications use the same printer driver, it is placed in shareable memory.

Bankable memory is constructed by the memory driver searching out and seizing unused sections of address space wherever it can. These zones constitute the bankable space which form the page frame for EMS usage.

Most LIMulators do more than just emulate LIM 3.2 or 4.0.

The EMS bank line

THE ROUGH division between bankable and non-bankable memory is called the EMS bank line, and it lies at the upper location of shareable memory. If an application's code or data is stored 'above the memory line', that means they will be banked in at context time. (Certain items such as video memory all go into a set location at the top of memory – see Stewart Fist's 'Extended, expanded... in May for the reasons behind this.) The location of the bank line is established by Windows when it is loaded and cannot be

changed without rebooting. Because shareable memory is such a valuable resource, Windows will attempt to place the bank line in as high a location as possible..

Many memory drivers use the adapter segment to store TSRs. This can reduce the amount of bankable memory available much more dramatically than if the TSR was loaded into the lower end of conventional memory. TSRs are placed into zones of free space as available. If a 20K TSR is positioned in a 60K zone of available low memory, the remaining 40K is still counted by Windows when positioning the bank line. If, on the other hand, a 20K TSR is positioned in a 60K zone of available memory in the adapter segment, the remaining 40K will not be counted. This is because Windows only registers areas 48K or larger in the adapter segment. Under these circumstances, the TSR is effectively 60K in size.

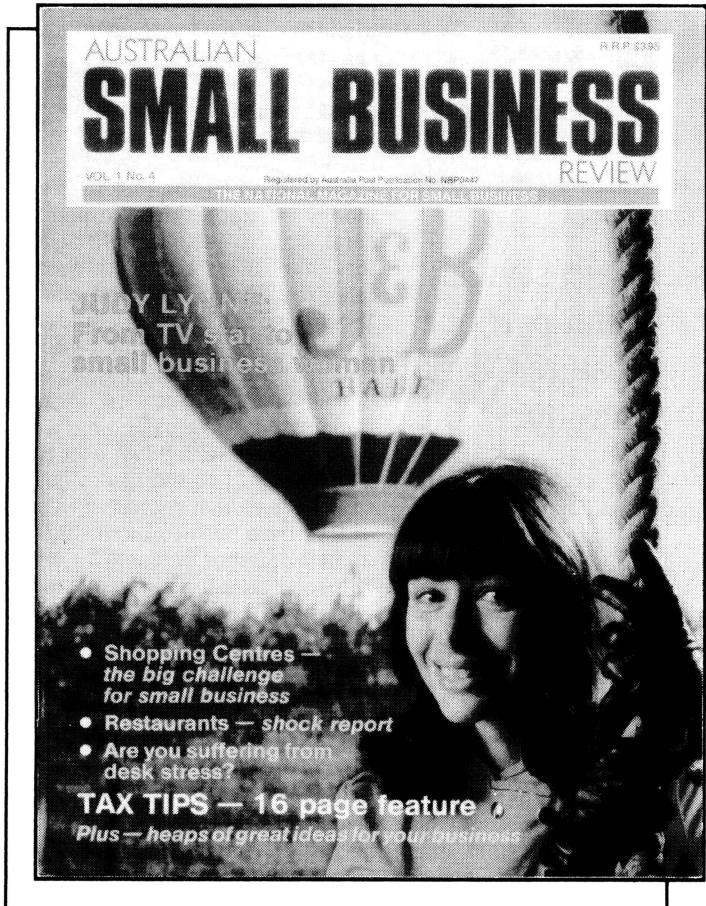
Conclusion

THE MAJOR problems with PC memory management are associated with a lack of conventional memory. The expanded memory page frames must sit in the adapter segment, and compete for space with everything else in there. Window's major opponents in this respect are network cards (especially token ring cards). Needless to say, any hardware which does not permit control of the locations its software resides at are a major headache.

In general all these problems derive from the newness of the technology and the techniques involved. There is a lot of software and hardware in the marketplace which doesn't respect the LIM standards fully. These items cause problems because they usually lock up memory, or fail to respect boundaries laid down by other software. There is still a wide range of hardware applications that don't permit the user to control the memory locations occupied by their software. Memory management is becoming similar to hard disk management, and the user needs to be able to arrange what goes where in memory the same way he controls what goes where on a hard disk. Many hardware manufacturers have yet to realise the importance of this.

Purchasers need to ensure the software and hardware they buy respects the EMS standards fully, and try wherever possible to buy hardware whose memory locations are user-controllable. There are a variety of utilities on the market these days for dynamically monitoring memory usage, and such programs should be a part of every serious user's toolkit. □

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CHOOSING AND IMPLEMENTING A NETWORK

THESE ARTICLES ARE intended to be a practical guide to local area networking, but before getting down to the business of connecting computers together, a brief introduction to the various network topologies might be a good idea. However, we won't dwell on this too much, since in most cases, the selection of network hardware will restrict the choice of network topology to that chosen by the designers of the network system – the exception being Ethernet, and we'll look at that in detail later.

From a software point of view, working within a network operating system is a little bit more complicated than a single-user PC. The network operating system takes care of making remote files appear as local files on local drives to each user. However, it must also take care to ensure that two users do not attempt to modify the same file at the same time.

Consider this simple example: A central database on the server contains a list of names, addresses and telephone numbers. User one has just received information that the address of one of the people in the database has changed, so he calls up that database record, and proceeds to modify the address. Meanwhile, user two receives a telephone call from the same person in the database, telling her that there is a new telephone number also. User two calls up the same record – still with all the old information, since user one hasn't finished changing the address, and proceeds to change the telephone number.

So now there are three copies of that record in existence – one on the file server's disk drive, with all the old data, one in the memory of user one's workstation, with the new address, but the old phone number, and the other on user two's workstation, which has the new phone number, but the old address. Now, when each user has finished making the changes to the database, the copy of that record which is held on their workstation

Part 1

There's no doubt that a properly installed network can be a boon for businesses with several PCs. In the first part our networking feature, Mark Cheeseman introduces the concepts, and gives some guidelines for choosing a system. Next month, he discusses in detail installing and implementing various types of networks.

given file open, other applications cannot access the file. This is required for the likes of wordprocessing files, where the whole file is read into memory at once, and modified en masse.

For database files, which have a strict record structure, a more sophisticated technique is possible, called record-locking. In the case of our database example earlier on, when the first user started to modify the address of the person in the database, that record would be locked, so that other users could not access it. All other records in the database are still accessible, so that several people can access the database at the same time. The only time that the operating system intervenes is when the two users try to access the same *record* at the same time.

In such a case, the first user to attempt to gain access to the record gains exclusive rights to that record, until such time as they have finished modifying it, whereupon it becomes available for other users. This sort of locking is possible in database files, since they have a strict record structure, so that the operating system can lock a specific record, by specifying the starting address and length of the record in the database file.

will be written to the disk of the server.

So, depending on who finishes making the changes to the database first, the entry for the person in question will have either the correct address, but the old phone number, or the correct phone number, but the wrong address.

This simple example serves to highlight the need to prevent more than one user modifying the same data at the same time. This is not a problem unique to networking – multi-user computers have been sharing files for years, and file- and record-locking techniques have evolved to prevent file corruption.

File locking is the simplest system, and means that while any application has a

Physical considerations

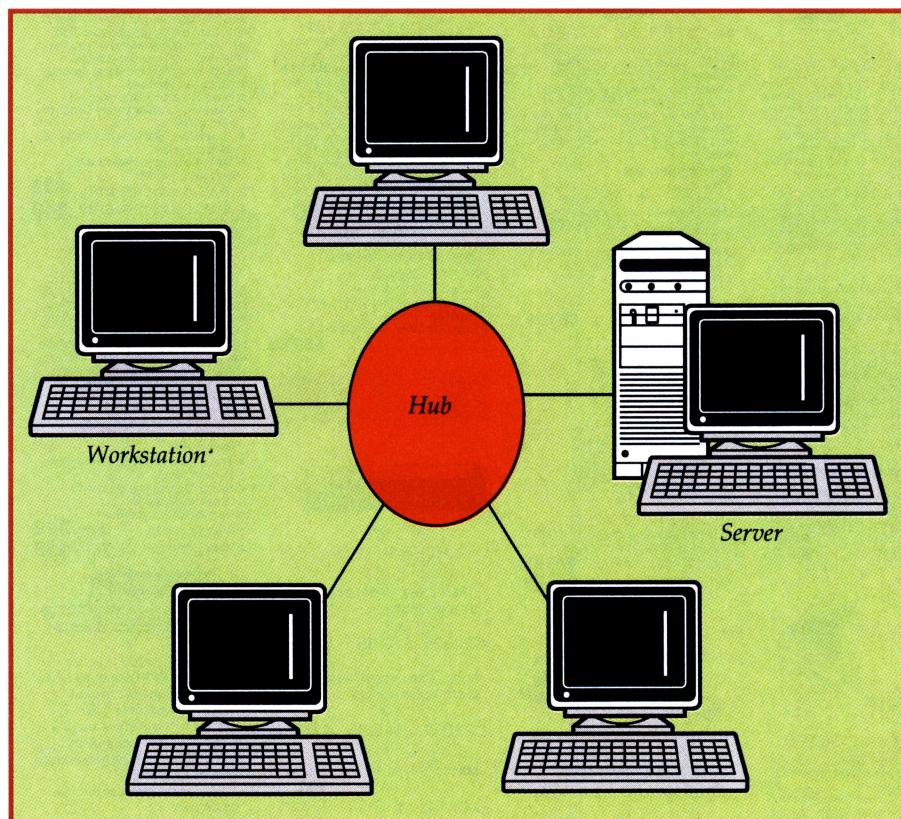
THERE ARE THREE basic network topologies – how the nodes in the network are connected to one another. They are the bus, ring, and star topologies. With the bus topology, the network cable starts with one node, and is snaked past all the other nodes in the network, connecting to each one, finally terminating at the final node. If the cable breaks at any point, the entire network (or at least a large part of it) goes down. Ethernet is the most common example of this type of network; another is Apple's LocalTalk.

A star network is a centralised system, where all the nodes connect to a central point, or hub. With a star network, if a

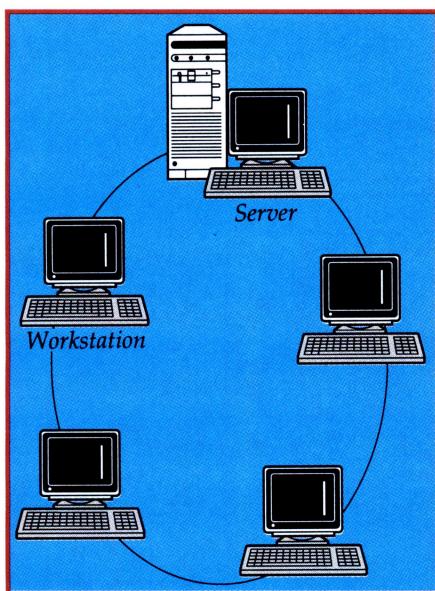
cable between the hub and a workstation is damaged, it will only affect that node, and not the whole network – provided that it isn't the server's cable that is damaged. A variation to the star network is the distributed star, where the cables from the central hub may connect to either workstations, or other hubs. Arcnet is a distributed star network.

A ring network has nodes connected in sequence around a ring. Each node can communicate only with the node next in sequence around the ring. If a message has to be passed to the previous node, it has to be passed all the way around the ring. IBM's Token Ring network has a ring topology, although from a wiring point-of-view, it looks like a star system.

I have already mentioned briefly several common types of PC networks, which I'll elaborate on a little further. Arcnet was originally developed about 10 years ago by Datapoint, and is a distributed star network using coaxial cable. Hubs may be either active or passive – active hubs are the more versatile of the two, and can be connected to other active hubs, or to passive hubs, for increased capacity. A passive hub cannot be connected to other hubs – only to workstations. Hubs and workstations are connected together by 93-ohm RG62 cable – the same cable used in IBM's SNA environment. Up to 255 nodes



Star networks have all nodes to the workstations connected to a central hub. A special case of the star topology has the server itself as the hub, but usually the hub is just a signal-routing box.



Ring networks pass messages around a 'ring' of cable until it reaches the destination workstation. Each cable segment is physically separate, and signals received by a node are re-transmitted to the next segment of the ring.

are supported on an Arcnet network.

Arcnet operates at 2.5Mbps (megabits per second), which is not blindingly fast, but faster than any serial port type network. A faster version has recently become available (ArcnetPlus), operating at 20Mbps.

IBM's Token Ring can be confusing at first glance, since it appears to be a star or distributed-star network. However, it really is a ring network, and certainly behaves like one in the case of a cable fault! Each node in the network is connected to a central hub, called a multiple-access unit, or MAU. The MAU is a simple signal routing box, which connects adjacent pairs of stations in the ring together. The MAU also incorporates switching to bypass unused connections, so that a workstation can be disconnected from the network without disturbing network operations.

The connectors used for Token Ring are rather unusual, because they also include self-shorting contacts, so that the ring is not broken when the cable is removed

from a workstation. This, and the switching in the MAU itself, ensure that a cable can be unplugged anywhere without disturbing network operations. However, cable faults can still interrupt the operation of the network. Instead of MAUs, you can use more intelligent repeaters, some of which have cable-fault detection built-in, and can re-route data packets around the problem area.

Token Ring uses a token-passing technique to gain use of the bus, as does Arcnet, rather than the collision-detection method used by Ethernet, or the collision-avoidance system common to LocalTalk (for an explanation of the two, see the box item 'LAN protocols').

Token Ring operates at 4Mbps, placing it somewhere between Arcnet and Ethernet in terms of speed. A faster 16Mbps variant is also gaining acceptance, although, like the faster Arcnet, it is not very common yet.

Ethernet is probably the most common type of local area network (LAN) around, in terms of the variety of machines which



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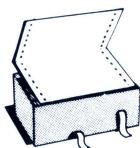
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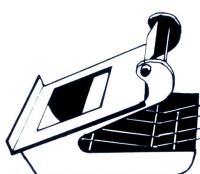
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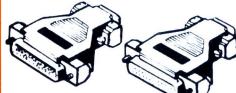
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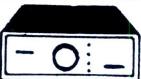


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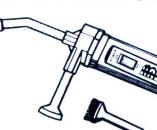
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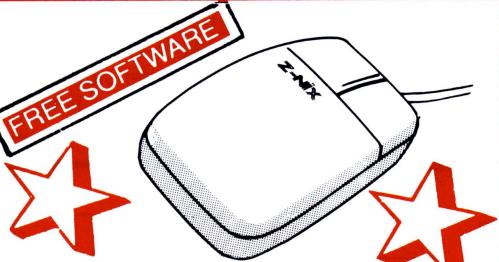
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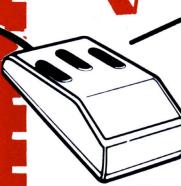
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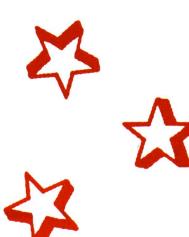


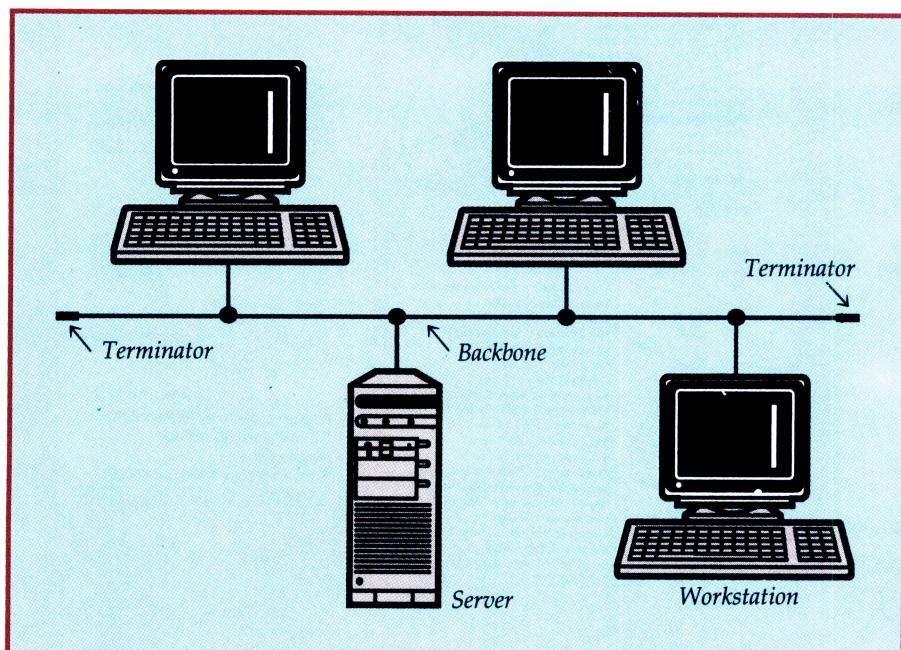
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There are two common types of Ethernet cabling, known as 'thick' and 'thin'. Both types operate at the same speed, but thick cabling has certain advantages for large networks. Thin cabling is the easiest to implement, since Ethernet interfaces have the transceiver for thin cable built in, and is the cable of choice for most installations.

Ethernet networks can be expanded into enormous affairs, by using repeaters and bridges. Both devices allow networks to exceed the maximum physical size which can be handled by a single cable. A repeater is a relatively dumb device – it connects two parts of the network together (called trunk segments) and transmits any data packet received on one segment to the other segment.

A bridge is a more intelligent device, repeating only those packets which are destined for a node on the other side of the bridge. Thus, each trunk segment is effec-

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tively a separate network, but messages can be passed transparently between them. This approach eliminates unnecessary traffic on the network, since each data packet is not transmitted willy-nilly to the other segment. A bridge maintains an internal table of which nodes are on what segment of the network, so that it knows which packets need to be repeated and which do not.

Multi-port repeaters and bridges are also available, which allow more than two trunk segments to be connected together.

Fibre-optic cable is the other main Ethernet cabling alternative, although it does not operate any faster than copper cable. However, it is useful for connecting distant segments of a LAN together, especially in lightning-prone areas, where long copper cables are an open invitation to trouble.

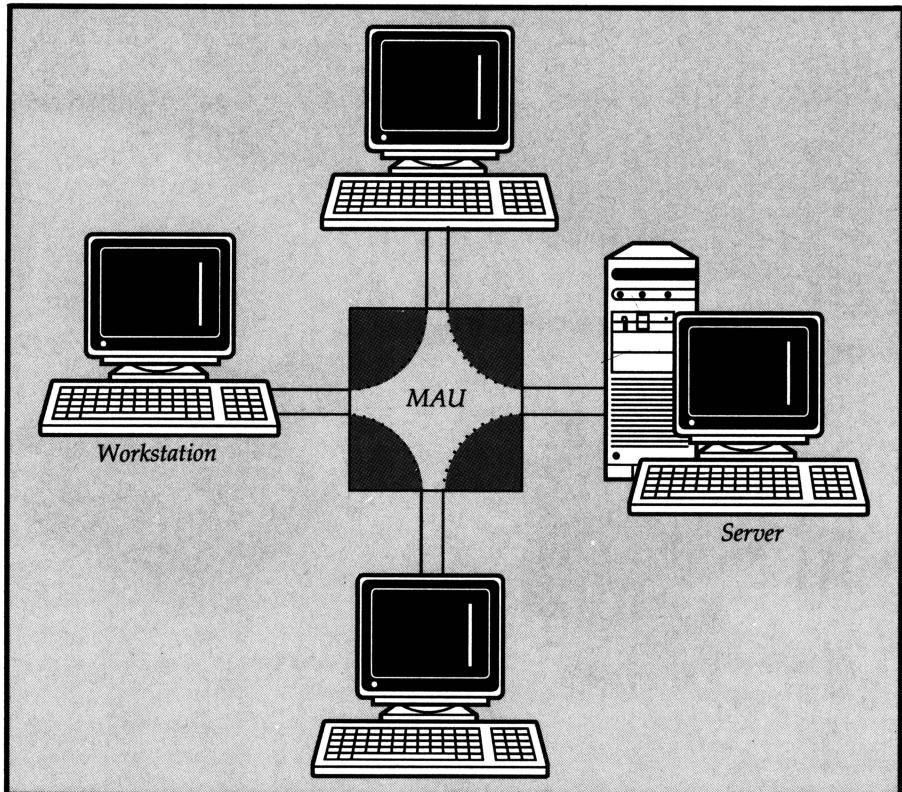
Because of the way in which fibre-optics operate, a fibre-optic Ethernet network has to be a star configuration, with a special fibre-optic hub at the centre. However, fibre-optic links are most often used where standard (thick or thin) Ethernet segments need to be connected together. Special fibre-optic repeaters facilitate the connection of copper and fibre cables together in the same network.

System requirements

BEFORE SPECIFYING the systems required for a network, a bit of thought needs to be given to exactly what the function of each of the machines is intended to be. Is there going to be a dedicated file server, or is the file server also going to double as a workstation? Or, are all workstations going to be non-dedicated file servers, so that all users can share each other's files?

The beauty of using non-dedicated servers is that no new machines need to be purchased to implement a network. By setting up all nodes on the network as non-dedicated servers, each user can access the files stored on other users' drives. This type of network is the easiest to install if the computers already exist as separate entities, and it is desired to network them. Also, if the amount of file sharing which needs to take place is small, there is probably no need to go for a dedicated server system.

Such a network has its disadvantages, however. For starters, the amount of memory required in each server is more than is required for a non-server node. This is particularly important if you are running memory-hungry applications. Also, file and print requests from remote



IBM's Token Ring looks like a star network, with all workstations connected to a central hub. However, it is really a ring network, with each node connected only to the next one in sequence, through switching in the MAU (multiple-access unit).

machines chew up CPU cycles, so if people are accessing your files a lot, there will be a noticeable drop in performance, especially with processor-intensive tasks (which is pretty much everything these days).

Also, if a user manages to crash a machine, it will upset any applications that others may be running which need to access files on that machine. Also, if a machine needs to be re-booted, a pretty common occurrence these days with the differing memory requirements of many pieces of software, care needs to be taken. It goes without saying that any non-dedicated file server should not be turned off while other people need to access files stored on it. Of course, this also applies to dedicated file servers, but they are usually left running continuously.

With a dedicated server, the RAM overhead in each workstation is much reduced, and you won't encounter delays while other users access files on *your* machine. When networking existing computers with a dedicated file server, the decision of which files should remain on

users' local hard disks, and which ones should be on the server, needs to be answered. Obviously, any files which are to be shared by more than one user, should be on the server. Likewise, any files which should be backed regularly would also be better placed on the server, assuming that a regular backup procedure is in place on the server.

The choice of hardware for a server is one of the most important decisions for a network installer to make, after the selection of the operating system itself. The server has to provide file and print service to a large number of people, and if a bottleneck is going to occur, it's more than likely going to be in the server.

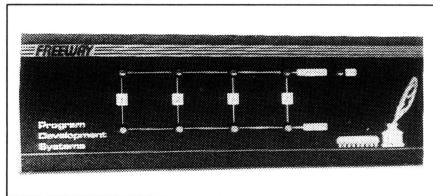
The bare-minimum system for a server would be an AT-level machine, with 1 or preferably 2Mb of RAM (depending on the network operating system requirements), and a fast hard disk, of the required capacity. Depending upon the application, this should be sufficient for a small network of about half a dozen people. On the other hand, a fast '386 with 4Mb of RAM and a speedy SCSI or ESDI hard disk



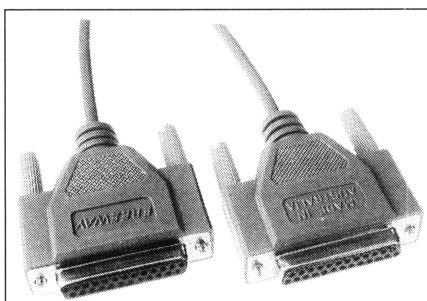
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Freeway, from Program Development Systems, is a new LAN alternative designed to maximize your computer resources.

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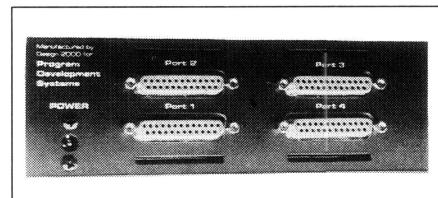
PC magazine (UK ed. Pg 64 June '89) said "...Freeway is the first file-transfer program with multitasking facilities. Its also the only program... which uses pop-up windows... Freeway lets you share a printer with a remote machine simply by popping up the Freeway window and selecting the printer option".



Your Computer Magazine (Pg. 24 Feb '90) said when awarding the Australian Hardware and Software Commendations "But the next product made our decision easy - it is commendable in both categories... Freeway offers an Australian networking solution for offices.."

Freeway has advanced features too, like security on disk access, and a message facility. Freeway can even duplicate your entire hard disk.

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**Program
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Systems**

should be more than adequate for larger networks, or more demanding applications such as CAD or desktop publishing. The server uses the RAM for caching the hard disk, and you may find that you need more than that on large networks if performance is not to suffer.

A system which is easily expandable is a good idea, especially if the network is likely to grow in the near future. Of course, if the choice of server proves to be a little under-powered later on, you can also buy a new one, and use the old server as a workstation.

Specifying a SuperVGA card and multi-scan monitor for a dedicated server is wasteful, since most of the time the screen will be essentially blank, or just displaying routine status information. Similarly, a keyboard is often not required on a server, so it is nice if the BIOS in that machine will allow it to boot without a keyboard connected.

The server needs to have ports for any printers which will be connected to it, and a monochrome video card will almost always have a printer port on it. Also, the server and any AT or '386 workstations,

should have 16-bit networking cards, to maximise throughput. Putting an 8-bit network card in a 33MHz '386 server is asking for bottleneck trouble, if not immediately, then certainly later on, as more workstations are added to the network, or the applications become more demanding.

If the workstations already have their own hard disk, there is probably not much point in removing them, unless you have a security-related reason for doing so. Also, it is a good idea to have a reasonably complete copy of Dos on such hard disks, so that they can operate as standalone systems if the network should go down for some reason. Applications which require data files stored on the server may as well be stored on the server itself, to save wasting disk space with duplicated files.

At the other extreme, workstation computers may be set up with no disk drive at all. Obviously, such nodes cannot boot from a local drive, so they boot from the server itself. To achieve this end, most network cards have a socket for a remote boot EPROM (erasable programmable ROM), which allows the computer to boot

from system files located on the server. Diskless workstations allow for a very secure system, since data cannot be copied onto floppies and taken away. Diskless workstations also offer protection against viruses, since users cannot put a virus-infected disk into a drive and introduce it to the system.

The down-side, of course, is that users who do have a legitimate reason to copy data to or from a floppy disk cannot do so. Also, if the server dies for any reason, a diskless workstation is not even capable of booting up, let alone running applications independently of the network.

Security

ONE OF THE most important aspects of installing a network operating system is that of system security. Protecting sensitive files from unauthorised access, and protecting users' personal files from other users is a problem seldom encountered with standalone PCs. However, on a network, it is easy for users to look at and modify files that they shouldn't.

There are two basic philosophies of network security. One is to allow everyone ac-

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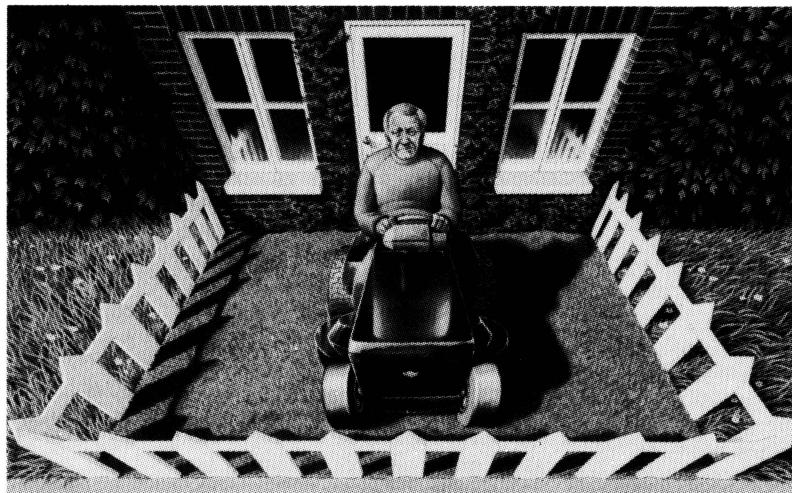
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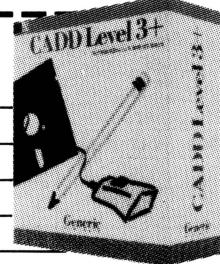
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LAN protocols

IN ORDER TO maintain some sense of decorum on a network, there are set protocols which define when a node can talk, and when it should listen. As usual, there are several different ways that it can be done, depending on the physical arrangement of the network, and the preferences of the architects of the network specifications themselves.

Ethernet uses a technique with the rather prosaic title CSMA/CD, which stands for carrier sense, multiple access/collision detect. With this system, all nodes continuously monitor the network for activity, specifically for packets of data addressed to that particular node. When a node wants to transmit something (which has to happen eventually, somewhere on the network), it first monitors the network to see if there is activity on it. If there is, it waits for it to finish before starting to transmit its own information – this is the polite thing to do in any case, not just on a network.

When all is quiet, it starts transmitting. If all goes well, no other transmission will interfere with its data, and the packet will be sent uncorrupted. Unfortunately, there is a good chance that another node on the network will have similar ideas at the same time, especially on a complex sys-

tem with many nodes. If this happens, the two (or more) contesting nodes will sense the collision (the CD part of the name), and each will wait a random length of time before making another attempt.

This randomness causes the attempts to gain control of the network to be separated in time, so that one node will get its message in before the others. Of course, once this happens, the whole bun-fight will start over again for the right to transmit the next packet. Fortunately, this usually only happens immediately after the sending of a packet, so on a lightly-loaded network, there will be periods of silence between packets – most of the time, a node can transmit a packet pretty well when it pleases. This is why when a network reaches about 80 per cent of its theoretical capacity, things really start to slow down, as more and more collisions occur.

A slightly simpler variant of this is collision-avoidance, as used in AppleTalk. The principle is similar, where a node waits for silence on the network before attempting to transmit. However, it then waits an additional random period of time *before* attempting to transmit. This is because the hardware used with Apple-

Talk and similar systems is not capable of actually detecting a collision if one should occur. In the event of a collision, the packets will be garbled, and this will be picked up by the software, causing a re-transmission.

Token-passing is the other way in which networking can be implemented, and is usually used in ring-configured networks, such as IBM's Token Ring. However, there is no reason why token-passing cannot be used on a bus or star network, and indeed, it is used in the distributed-star Arcnet system. However, we'll use Token Ring for our discussion here.

With a token passing system, a node can only transmit when it holds the 'token', a special data packet which is passed around the network. The token is passed from node to node around the ring, and if a node has data to transmit, it transmits it before passing the token on to the next node in the sequence. If a node has nothing to say, it just passes the token straight on. Token Ring also allows priority levels to be allocated, so that some nodes are allowed to keep the token longer than others, and therefore transmit more data before having to relinquish control of the network.

cess to everything, unless there is some reason to bar access to somebody. The other is to grant access to particular files strictly on a need-to-access basis. Clearly, these are the two extremes of security, and which end of the spectrum you tend towards depends largely on your requirements.

Large networks tend to need more security than small ones. For example, a local office work group may need no security at all, if they are all handling the same data anyway. On the other hand, a large company-wide network would certainly require a fair degree of security, to prevent unauthorised people gaining access to sensitive accounts information, for example.

If users have their own hard disks, any personal files can be stored there. However, this shifts the responsibility of backing up those files from the network supervisor to the individual user. If you are designing a network from scratch, you may not want the additional expense of adding a hard disk to each user's workstation.

A much better solution is to give each user their own sub-directory on the server, and then restrict access to that directory. You can also set up a directory which can be accessed by a specific group of people, say, all accounts-payable staff. Users can be assigned to one or more groups, and directories can have access rights granted on the basis of user name, or group name.

Of course, the network supervisor can look at any file on the server, regardless of access rights, so your network supervisor should be a trustworthy person.

Dial-in access

ONE OF THE MORE potentially useful features of many network operating systems is the ability to accept dial-in access through a modem from a remote workstation. This allows, say, people working at home, or traveling sales people to access the full features of the network. Remote access to a network offers much more than a simple communications and file transfer program.

With dial-in access to a network, the

server's drives and printers appear as local devices – just as if the machines were networked by a physical cable. Of course, a dial-in line is a lot slower than a standard network connection – 2400 or 9600bps as opposed to 10Mbps for Ethernet.

For this reason, it is a good idea to have as many files as possible on the local drive of the workstation, and only using the network drive for shared files. So, while you can get away with having floppy-only or diskless workstations on a fast network, a hard disk is a good idea for a remote workstation, and diskless workstations are not possible at all, since auto-boot software is not available for remote workstations.

If you decide to incorporate dial-in access to your network, then the subject of network security is even more important, since the additional level of security offered by restricting physical access to the workstations is no longer present. Of course, having your network dial-in line listed in the phone book is silly, but don't rely on an unlisted number to keep people out of your system.

Mac networking

UNLIKE THE IBM PC, which was designed without any planning for networking, the Mac had networking built-in from the ground-up. For starters the Zilog serial chip used in the Mac is much more versatile than the chip used in the IBM PC, and the software for sharing printers is already part of the Mac's operating system.

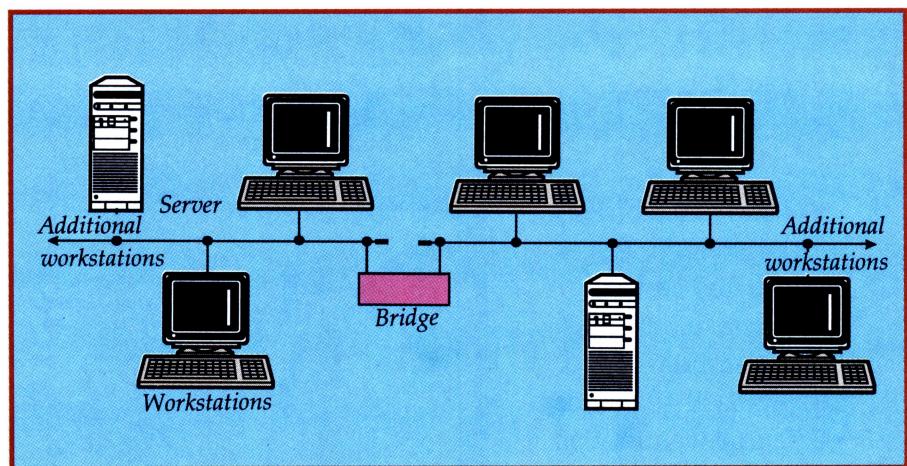
With the addition of a simple interface box and some cable, several Macs can be connected up to a single LaserWriter, and with the addition of networking software such as Tops, file sharing is also possible. The Apple LocalTalk system, as it is called, uses shielded twisted-pair cable, terminated in miniature 3-pin Din connectors. The interface boxes automatically terminate unused ports, so that the user doesn't have to worry about terminators.

There are a number of third party suppliers of AppleTalk hardware, which use cheaper cable, such as standard twisted-pair phone cable and modular connectors. You can also get AppleTalk cards for IBM PC compatibles, so that they can share resources on a Mac network.

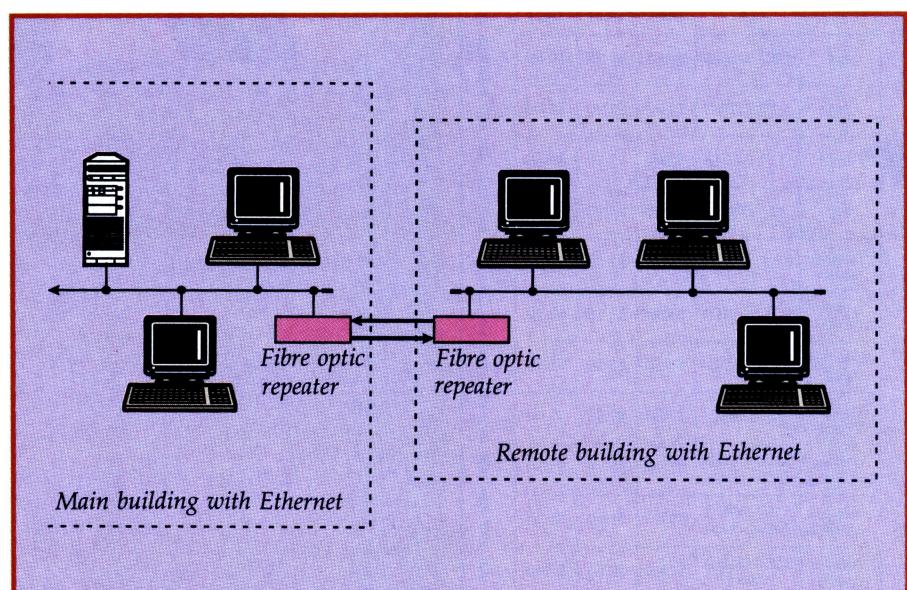
One of the reasons that many people baulk at installing a network is the sheer complexity of the task. First of all, machines have to be chosen for use as the server and workstations, or existing machines have to be adapted. Network cards have to be installed in each machine, and set up in such a way that they don't conflict with other hardware in the machine. Then the operating system needs to be installed on the workstations and the server, which is a pretty major undertaking in the case of a full-featured operating system such as Novell.

Novell allows PCs and Macs to be networked together, using the same server. The PCs are connected to the server in the usual way, using Ethernet, Token Ring, or what have you, and the Macs are connected together using Apple LocalTalk hardware. A LocalTalk card is then added to the Novell file server (or in another machine acting as a bridge), and the Novell server is available for use by the Macs. In addition, PCs on the server can access any laser printers which are on the LocalTalk cable. You can even add to this dial-in access, for PCs only, for a truly flexible network.

One of the biggest problems with installing PC networks relates to the fact that networking wasn't considered in the design phase of the PC and its successors, so there are no standard addresses and interrupt lines for a networking card. For



Ethernet segments can be connected together via a bridge, to combine them into a single network. Here, two servers provide file and print service to their own group of workstations, but workstations can access the file server on the other side of the bridge if required. This is useful if a user needs access to a file or printer on the other server, and allows one server to provide a backup for the other in the case of failure.



Fibre optics can be used to extend an Ethernet network over a large distance, especially in lightning-prone areas. This example has several workstations in a remote building connected to the main backbone and server via a pair of fibre optic repeaters and fibre optic cabling.

this reason, virtually all networking cards come with a number of jumpers, to select a suitable interrupt line and I/O address range.

However, it is not too difficult to find a vacant spot for the network interface card, since virtually all the other devices in PC systems have predictable addresses and interrupt lines. The only time complexities

tend to arise is when you have other unusual peripherals in one or more of the workstations, such as CD-ROM adapters, scanners and the like.

The big problem with the PC is interrupt lines, or rather, the lack of them. The PC and XT only had eight interrupt lines, most of which are taken on even a standard system, and when you add options

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NETWORKS

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The Systempro is based on the EISA bus, and incorporates a 512K cache, for a claimed 35 per cent speed improvement over 128K caches. System RAM starts at 4Mb, and is expandable to 192Mb for a dual processor system, or 256Mb with a single processor. Disk storage is handled by a synchronised-spindle drive array, with a capacity of

1.68Gb internally, or 4.28Gb using an external drive chassis. Mirrored drives and controller duplexing are supported, for increased fault tolerance.

The EISA bus allows for intelligent bus masters, and allows data to be transferred to and from memory at speeds of up to 33Mb per second. Bus master network interface cards allow much greater performance than the usual 'dumb' network cards, and cards available include dual speed Token Ring, Ethernet and Arcnet.

Also included in all configurations are two serial ports, a parallel port, and a mouse interface. (Why anybody would want a mouse port on a file server is beyond me though. Maybe some mega-power users out there want one of these for a standalone PC!)

Pricing starts at \$15,995 for a single '386 system with 4Mb of RAM and a 120Mb hard disk. For more details contact Compaq, on (02) 660 0077.

such as a hard disk and second serial port, you can be left with as few as one spare interrupt line.

The AT improved on this, almost doubling the total number of interrupt levels to 15. However, some boards do not support the extra interrupts, and XT-type boards (without the extra bus edge connector) are physically unable to use the extra interrupt lines, since they are only

available on the extended AT-style cards. We will look at addressing and interrupt requirements in detail next month, when we actually set up several sample networks.

We will also look in detail at several PC networking systems, and discuss their installation and operation. If you've put off installing a network because of its complexity, don't miss this issue! □

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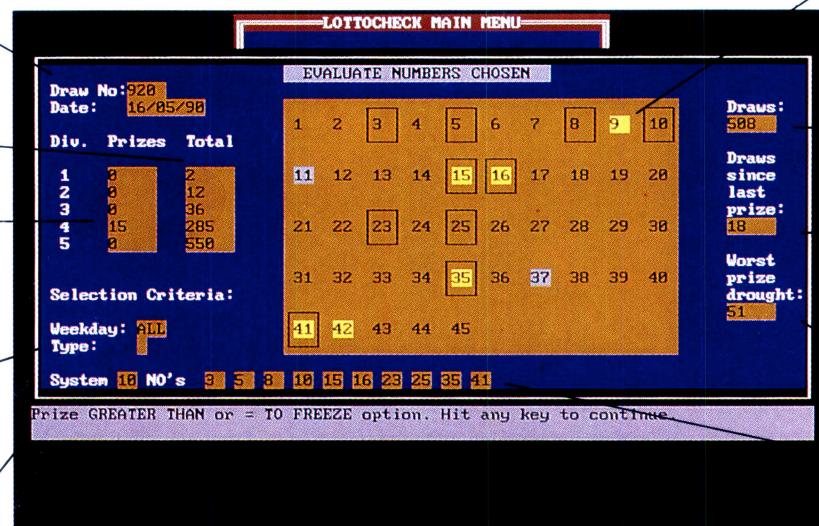
The date and draw no. of the Draw currently displayed on the (coupon-like) screen.

This is the total number of prizes won so far, by this particular System 10. i.e. up to Draw 920.

The no. of prizes won by this System 10 for this draw. i.e. Draw 920.

The user can set *Restriction criteria* such as WED - for Wednesday draws only. In this case no restrictions are currently set.

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Numbers shown here with yellow backgrounds, are the winning numbers for Draw 920. (Supps with white)

Total number of draws analysed so far. (i.e. from Draw 413 - start of 6/45 - to Draw 920)

The number of draws prior to this one, when this particular System 10 last won any prize.

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These 10 numbers are the particular System being currently tested. They each have a box drawn around them on the screen-coupon.

The screen image above depicts an analysis of a *System 10*, using the *Prize Option*. But that's *small fry* compared with the maximum System you can test with LOTTOCHECK - it can test from 6 through to System 18's. A *System 18* costs a cool \$14,087.00 a week (or \$9,322.00 in NSW GoLOTTO) - that's \$3,662,620.00 (or \$2,423,720.00 in NSW) over a 5 year period! In other words, you can test Systems that would have cost you *millions of dollars*, in just *seconds* on your PC with LOTTOCHECK (for a once up cost of just \$95). And that is what *Personal Computing power* is all about.

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Australian businesses are convinced they are in a recession – except in Queensland, Jake Kennedy found. There the market is buoyant and the future looks lit with sunshine.

THE STATE OF Queensland is a microcosm of Australia centered on Brisbane – the markets there are wide-spread, largely self-sufficient and relatively isolated. Because the state's PC industry is part of the microcosm, we were interested to hear how that industry sees the current state of its market. (Elsewhere, the dogs of recession seem to be in full flight.)

'Our best June and July ever,' commented Richard Fraser, managing director of Western Computers. And, it wasn't just government departments on end of year spend-ups: 'Our sales to private enterprise have never been stronger,' Fraser added. 'Buyers are tending to look around more now and are increasingly particular about brands and quality.'

Shopping around seems to be the trend. Ross Benson, marketing manager of Pacific Rim, attributes his company's rapid growth this year to the fact that purchasers are spending more time on decisions. 'People have become very price and service conscious – once we're given a chance to compete, we stand up very well.'

And – two leading players in the national computer market have each recog-

nised the efforts of Queensland companies. Hewlett-Packard dealer Applied Micro Systems experienced nearly a 300 per cent growth in units shipped during 1989, and a 50 per cent growth in revenue. This effort made them HP's Dealer of the Year. Applied Micro's marketing manager Roger Phare said, 'When the shake-up started in the industry, we made a commitment to high level support with an emphasis on *correctness* of distribution. We not only deliver, but unpack, install and make sure everything is running correctly.'

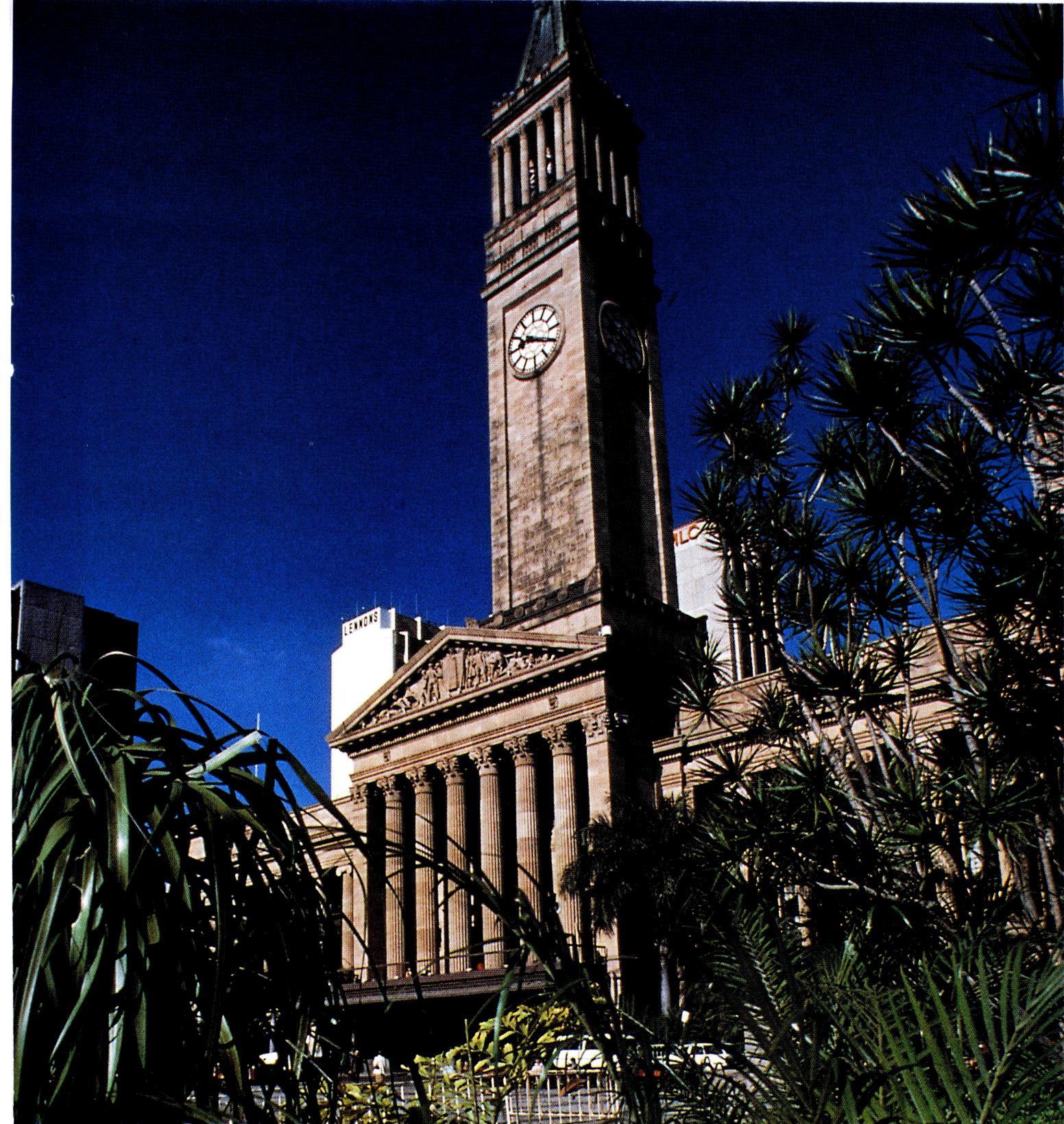
HP also named Delta Technology Queensland State Dealer of the Year; the company is a graphics product specialist and is currently enjoying great success with FrameMaker, a high-end desktop publishing system that runs on Unix systems (see 'Graphics for Presentations' in our July issue).

On a whirlwind tour of Australia in July, Epson Japan's general manager, corporate planning, Toshio Kimura, and the Australian managing director, Shuzo Isoda, made a special trip to Comsoft's Spring Hill office to congratulate managing director John Martin on his company's sales efforts with Epson products. Comsoft is the largest supplier of Epson products in Queensland, and Queensland currently leads the country in Epson sales.

Reaping the benefit

IN OUR Queensland feature last year, Bill Hartzia noted that 'Queensland's personal computer industry has entered a new phase of consolidation and maturity.' This year, that phase seems to be tailing to an end. As Alan Irwin of Eagle Computers noted, of the 20 or so large players in the Queensland market, 8 or 9 have left the field in the last 12 months – including national players Arcom Pacific and CCA Systems (Cleveland): 'The rest of us are now reaping the benefit'.

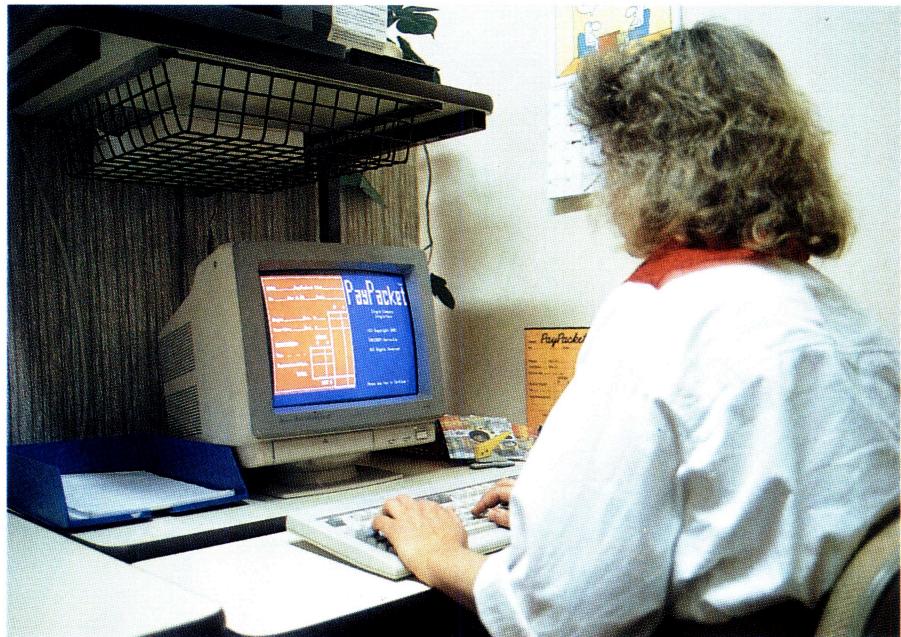
But, as any budding entrepreneur knows, there's usually more to success than sitting back and harvesting someone else's failure: it takes hard work plus market savvy. About four years ago,



QUEENSLAND



Digital Solution's Clarion usually finds a home with professional custom software writers (see our review in the June issue), but Brisbane programmer, Phil Stafford, also found it useful for maintaining membership records in a local polo club. (Keeping track of the horses is easy: none of the members owns one!)



Logisoft is a small business in Toowong paying out in big business: its Pay Packet software is being used by Kelvinator Australia, Southern Television Corp and a range of other industries from ship building to heavy engineering. It's also being used for educational purposes in high schools.

Ron Shaffran came to Queensland after a career in software development in the US. He found himself feeling isolated from the mainstream after working in the States and was frustrated by the lack of good mail order houses (which are myriad overseas) as he attempted to stay on top of developments.

Shaffran soon found that others had the same problem. Rural users were particularly disadvantaged – many of them are hundreds of miles from the closest milk bar, let alone computer shops. So, he founded Pacific Rim and set up an office in Redcliffe. The company has built a substantial reputation with its mail order business, because 'we know how difficult it is for country users to get support, so we help them as quickly as we can'.

The entrepreneurial spirit is certainly alive in John and Mary Jewell who have built a successful business as the largest Queensland distributor of Commodore Computers and other PCs. United Computers (see the box item 'Police Academy 6, 7, 8...'). They also have a second interest which has become a success in its own right: camels. Since reading about the Great Australian Camel Race in 1986 and becoming fascinated by the part they played in Australia's history, the Jewells have become convinced that the animals represent a vast untouched resource, worth millions of export dollars per year. In fact, they have touched that resource and are now exporting camels to the United Arab Emirates for racing (our local breed is impressively bigger and more spirited than the thoroughbreds that are traditionally raced).

While a successful business should have its divisions integrated, at least to a certain degree – John uses computers to keep track of the export paper work and other details relating to the Gold Coast-based Camels Australia – he has yet to find a use for the camels in his computer business.

Success . . . is people

MILTON-BASED Q*Soft (the asterisk is silent) started operations in 1985 with two employees, distributing Microsoft products – in 1990 directors Ross and Margaret Calder led the company and its nine employees to become Microsoft's number one distributor in Australia. Q*Soft also deals in Infomagic's range of graphics and illustration products and NetComm modems: the latest addition

to the range is Innovative Data Design's MacDraft v2.0, a drawing and design package which is currently sweeping the field in the US.

'Q*Soft's success is its people,' said marketing manager Karen Hayes. 'We don't get bogged down with drawn out procedures so we have excellent response time.' That success hasn't been without some pain though: the company has had to move to larger premises three times in the last four years as the business grew.

'Down south' we tend to think of Queensland as a late-comer to high-tech developments, but Berwicks of Kangaroo Point, Brisbane, has been with the front of the pack since 1930 (the company is currently celebrating its Diamond Decade), when Len Berwick began supplying 'reliable office equipment' to Queensland. One of the company's early successes was the Ediphone Dictating Equipment range. Since then, the family-owned and managed company has seen technology move through 'talkies' (which it supplied to schools and the army as training aids), wet and dry co-



'We consider the Asian market as one of the few where we enjoy an advantage over US and European competitors. Now, with the move against piracy in Hong Kong and Singapore, the markets there are becoming viable for the first time.' — Bob Waldie, managing director of Stallion Technology.

piers, to electronic white boards, networking, laser printers, electronic organisers and the ALR range of PCs.

Berwicks tend to take a broader view of computer products than most companies in the industry — it views them as a part of 'office automation', not an end in themselves. This attitude (and commitment to 'outstanding after-sales service', director Janne Berwick pointed out) has helped the Berwicks develop a loyal following of customers — 60-year's worth!

Speciality service providers are also doing well in Queensland. Yeronga-based Datacare caters to the demands of non-profit organisations — its Churchcare software suite was specifically developed to cater for the needs of the Australian Council of Churches. With over 200 sites from most of the major denominations currently using the software, the company is leading the field in this area. It also supplies Epson and Amstrad computers as well as a range of printers and general purpose software.

Directors Bruce and Gail Riddel, both with extensive mini and mainframe ex-

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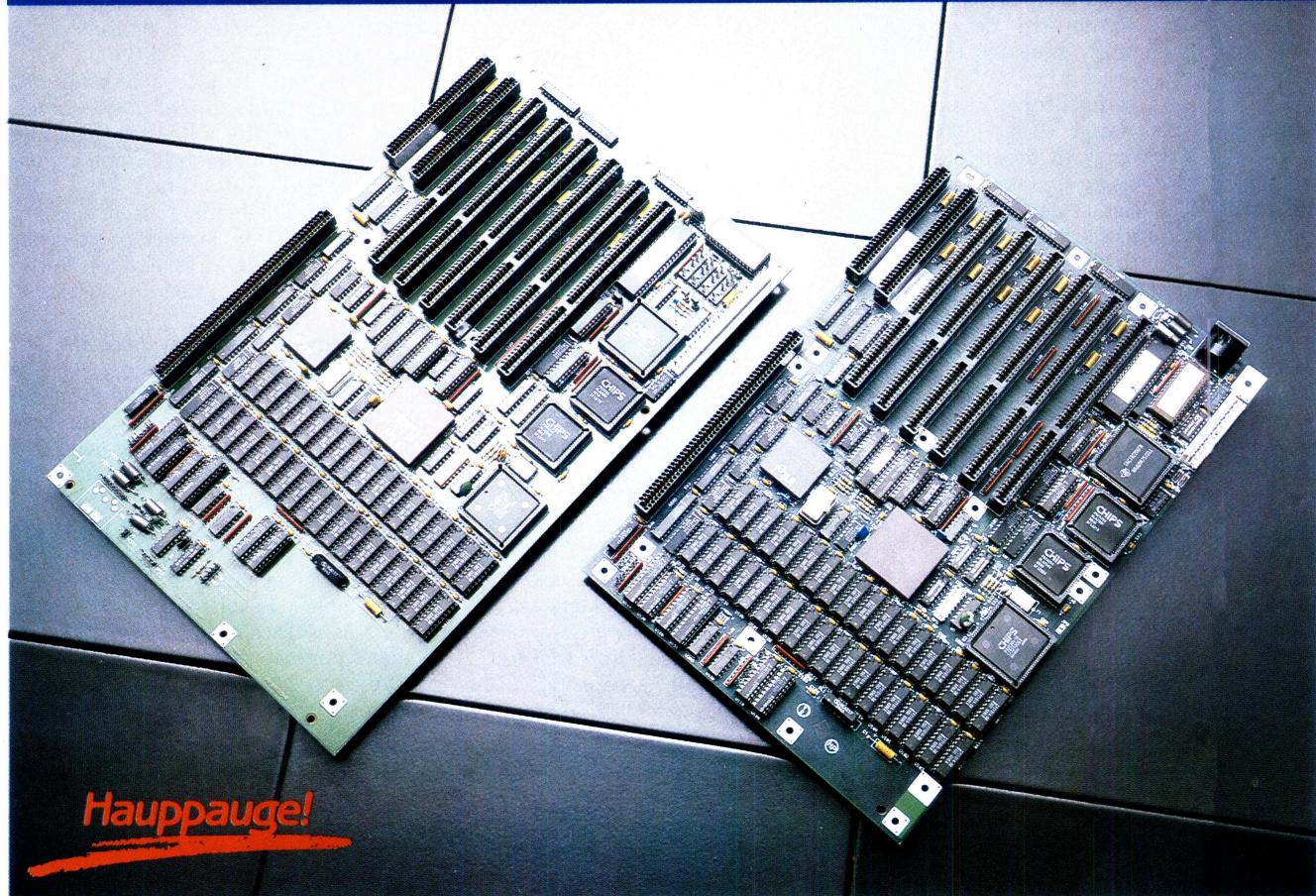
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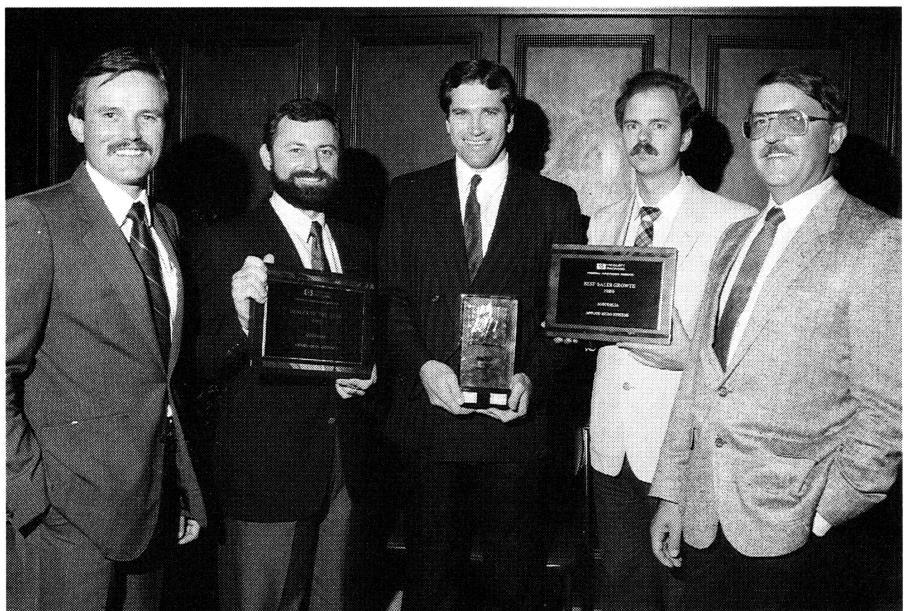
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perience, have seen the company grow since its founding in 1982 to 10 employees and several operating divisions. In addition to Churchcare, they have developed Donorcare, a donation management system for those involved in fund raising, a musical database reference for finding hymns and choruses that fit a particular theme and Crossref, which catalogs references from books and journals under various topics – it's designed to assist in sermon writing, but has a much broader application than that.

Why have the Riddells chosen to concentrate on such a seemingly small niche? 'Because of Gail's and my personal faith, we view this area not merely as a business, but an opportunity to assist churches and those involved in other non-profit organisations to be more effective in their work,' explained Bruce. The company was recently appointed Queensland agent for Epson's industrial products – the Riddells feel this is a much neglected market in Queensland.

When Mike Ahern was Queensland's Technology Minister (and later, Premier)



Applied Micro System's business grew 300 per cent in 1989, making it Hewlett-Packard's Dealer of the Year. Pictured (left to right) are Nick Debenham of HP; Ian Petherbridge, Allan Brackin (managing director) and Andrew McNicol, all of Applied Micro; and John Bieske, Australasian marketing manager for HP.

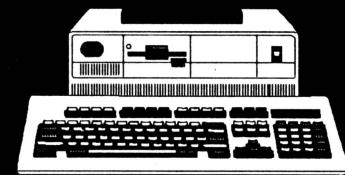
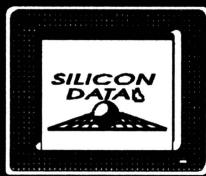
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Leprechaun fights virus!

EARLIER THIS year, *Your Computer* had its own virus problem (see Jake Kennedy's editorial in the May issue). We weren't alone – in the last 12 months we have been following reports of virus-infected disks from an accountant in Rabaul, a Sydney-based disk duplicator, a Melbourne law practice and a host of others. There is no question that 'infestation' is a worry to any business that depends on its computers.

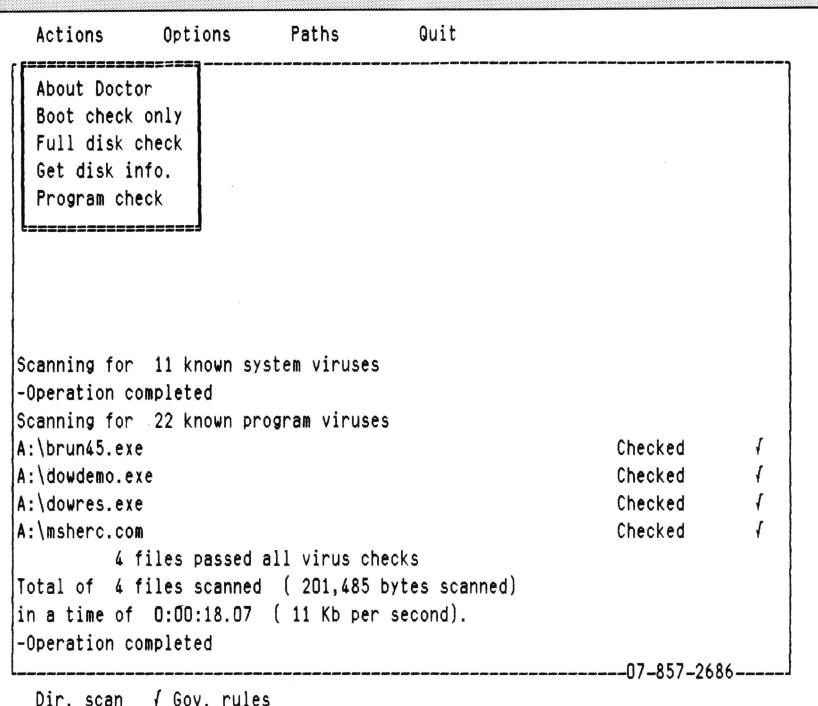
Most of us have only come to realise that in the past year or so, but the man we call (and refer readers to) has known it ever since an encounter with the Mushroom pseudo-virus almost three years ago. As Roger Thompson relates his story: 'At the time I was one of those who believed either viruses didn't exist or had nothing to do with me. I turned my computer on one day and the jingle from Mushroom came up. I was impressed by what I thought was a neat little program and shared it with a couple of clients. Two days later I was told it was a virus and spent eight hours tracking it down and getting rid of it.'

'I set out to get rid of Mushroom with years of programming experience and a doctor's bag full of specialist utilities. I could clean my machine and my client's computers, but I wondered how someone without the same skills could deal with the problem.'

He called on a friend, Jack Kenyon, to help: 'Jack had written a file manager and with the work I had done, it didn't take us long to get a prototype of Virus Buster together.'

Since then Thompson has become a nationally recognised expert in the field. He and Kenyon gained experience working at infected sites, but now 'we send them a package which can handle the virus and only visit sites where something new has appeared'. Thompson's company, Lutwyche-based Leprechaun Software, is constantly updating Virus Buster as new viruses are identified anywhere in the world, rather than waiting for them to make their appearance here in Australia – with world-wide electronic networks and bulletin board systems, anywhere in the world is just a download away.

While not wanting to mention any names ('to protect the guilty'), Thompson tells the following tale about a large NSW government department: 'One Friday a small but strategic unit of the department turned on its computers at the start of the day. The importance of its work demands precautions against com-



puter viruses, but no member of the unit felt they pose any threat to the operation.

'One of the precautions has been the site installation of Virus Buster which checks all program files before the unit begins work each day. This day, Buster sounds an alarm and reports that a number of programs have changed in size and content since the last check. This has not happened before and staff were puzzled and called in support staff who soon realised a virus had penetrated the system.'

'They activated the Doctor module of the Virus Buster package and went to work. But – Doctor scanned the program files and found no known viruses. Other virus scanning packages also failed to report a virus infection. The staff then turned to another Virus Buster application, Watchdog, to investigate further. Watchdog identified a suspect file and detected suspicious disk writes, so the department called Leprechaun and reported a (possibly) new virus.'

'The unit sent a copy of an infected program and an original copy of the same file to Leprechaun where the presence of a new virus was confirmed. By the following Tuesday, the Doctor module had been updated (to version 3.24) to combat it, now christened the Sydney 1714 virus, and a 'fix' was sent to the department.'

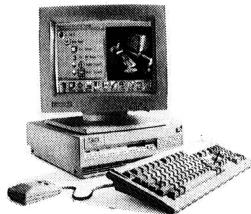
Unfortunately that wasn't the end of the tale ...

'At the unit, staff wasted no time in getting the new Doctor working against the virus. In the frantic action to get the system up and running normally again, support staff overlooked the Doctor's normal memory check. They soon discovered that the virus was again loose and had infected the Doctor itself. Following emergency procedures, the computer was immediately switched off and rebooted with an original, permanently write-protected Dos diskette.'

'After re-installing development programs and generating a new copy of the Doctor, infected programs were again found on D: and E:, and the C: drive had been destroyed – the File Allocation Table contained numerous impossible values and Dos refused to deal with the mess. A re-format and re-installation of Dos got the system up and running again.'

'From that and similar experiences, it's apparent that there's more to avoiding trouble than following the steps by rote and every user needs to be vigilant. 'Viruses can get into any system and no-one who uses floppies can count themselves safe,' Thompson said. 'You must expect that one day a virus will get into your system and be ready for it.'

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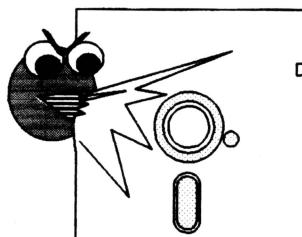
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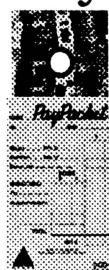
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Berwicks have been supplying office automation products to the local market since 1930 (this was their stand at the Brisbane RNA Show in 1938). The company has developed a broad perspective to PCs, viewing them as only a part of the office solution.

he moved to encourage hi-tech industries to set up in Queensland. While there were some successes, primarily with drawing manufacturers with head offices in other states to set up plants, there were spectacular failures. Most notable of these was the Sperry plant, which never became profitable despite selling upwards of 3000 PCs to local schools. The project typified those the government had become involved in – it was more notable for enthusiasm than effectiveness.

Sperry's problems were manifold (machines were frequently delivered to schools without drives, chips and software), not the least of which was competition from the Cleveland range of PCs (made by CCA) that were coming online at the same time. CCA's most first world-class success was R&D director Grahame Istead's developing a clone BIOS for IBM-compatibles. Over several years the company moved away from the local education market and concentrated on upmarket machines, primarily aimed at state and federal government contracts, culminating in being awarded a large part of the PC supply contract for Canberra's new Parliament House.

By then, the company realised it was losing its original base in the education market and set about developing a low-end 8088 machine. 'We are going to hit the bottom end [of the market] so hard it will bounce,' predicted managing director Ian Bennets at the time. Unfortunately, this end of the market had been

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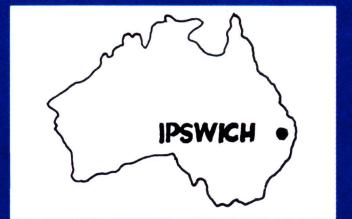
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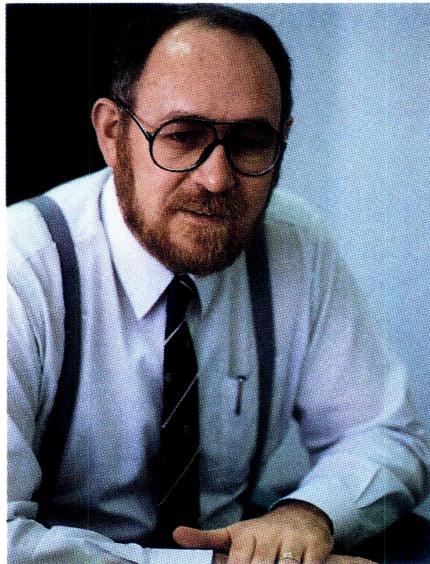
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flooded with cheap, imported clones and the new range never reached profitable production quantities, hastening the demise of CCA.

It hasn't been all bad news on the locally-developed hardware front, however. Western Computer, for example, has developed its own systems and has been nationally successful with high-end configurations. Recently, recognising the huge and ageing installed base of PCs, XTs and ATs, the company launched a new service: 'We are able to replace and rejuvenate any part in an IBM compatible microcomputer, from the keyboard, motherboard, hard and floppy disk controllers, to graphics adapter cards and monitors in refurbishment packages.' The company also has a successful line of business with the well-known Hauppauge and SOTA range of boards, as well as its own.

Internationally . . .

ON AN INTERNATIONAL level, Stallion Technologies (formerly Anvil Designs) has established an enviable reputation in the Unix market from its Toowong head office



Peter Eliot grew from his 1987-model Tandy with 2K of RAM to become a world-renowned Unix expert. His company, Release4, recently took over much of troubled MicroUnix, which is now concentrating on importing.

– it was one of the first in the world to successfully port Unix System V to an AT-system. In the past, the company concentrated on hardware, specifically the Stallion and Brumby ranges of multi-port, intelligent I/O cards for multi-user Unix systems. The company already has a distribution network established in Europe and North America, and earlier this year entered the Asian market. According to managing director Bob Waldie, 'We consider the Asian market as one of the few where we enjoy an advantage over US and European competitors.' He noted that the moves against both hardware and software piracy in Hong Kong and Singapore meant that these markets were now becoming viable.

In March, Stallion announced that it was expanding its research and development efforts into the wide area network (WAN) market and plans to release a number of new products this year. 'Companies with Unix installations and branch offices want a more flexible network enabling them to connect with more than one host computer,' Waldie said.

Another Unix specialist has also

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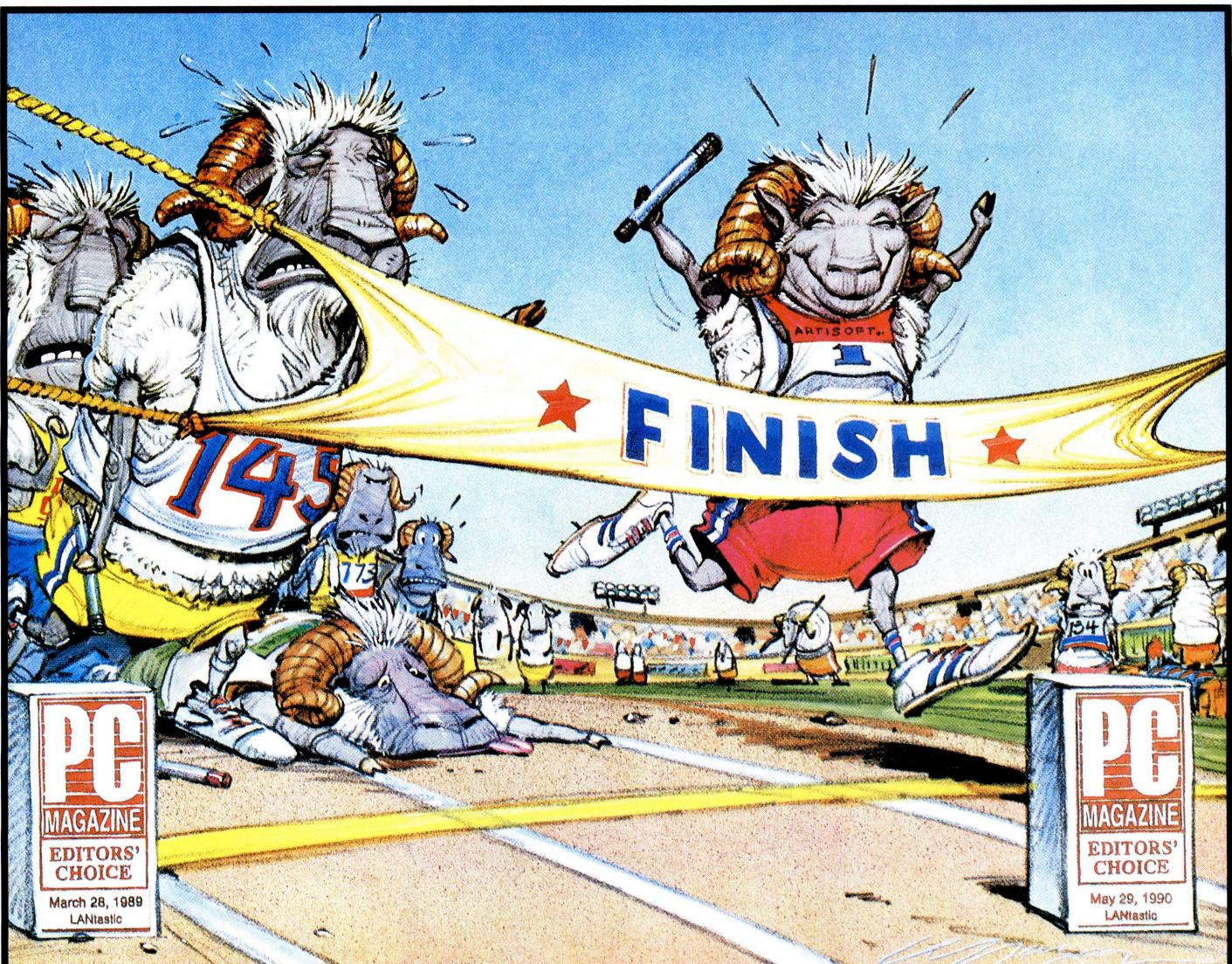
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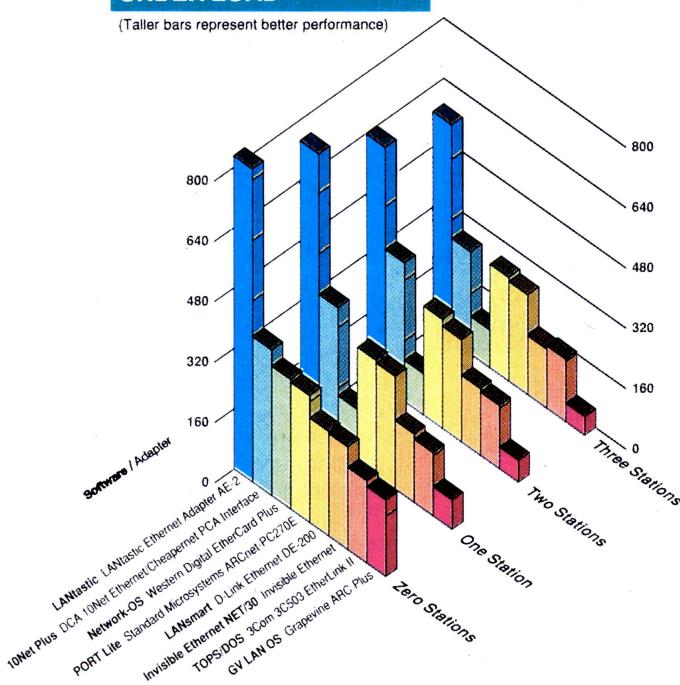
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FEATURE: QUEENSLAND

John and Mary Jewell of United Computers found there was more to the world than PCs and Queensland: they are also involved in exporting feral camels to the Middle East.

changed its name — Q-unix is now Release4. 'With offices in Sydney and Melbourne, we wanted to move away from the 'Q' in our name — although it stood for quality, it was often associated with Queensland.' The new name also reflects

the company's commitment to Unix System V Release 4.0, which it feels will be the major version for the next several years. Release4, based in Spring Hill, recently acquired troubled MicroUnix's Melbourne head office and its Brisbane

branch; the Sydney office of MicroUnix (the company has been re-structured to concentrate on importing) was not taken on, but the sales team moved to Release4's Chatswood, NSW, office.

In the past 12 months, the company has doubled its turnover and added 20 new staff (not counting the increases as a result of the MicroUnix move), but chief executive Peter Eliot knows how to handle it. As a young doctor, he started an after hours medical service that grew to 40 doctors treating 2000 patients a week. But by 1987, after an apprenticeship on a Tandy with 2K of memory and moving on from there, Eliot had developed a solid international reputation for Unix expertise and launched Q-unix.

'The acceptance of MIMS is irrefutable evidence that Australian-developed software can compete and win world-wide on its own.'

After Stallion, a second Toowong-based company is enjoying international success, albeit in a different direction. Martrad International is in the business of 'helping Australian companies take advantage of the booming Asian economy — in the next 10 years, Asia will be the future of Australian business,' said principal Kristen Moore. In conjunction with the National Australia Bank Travel, her company has launched a program of international trade fair packages.

The next big event which Martrad is 'packaging' is the 5th information technology exhibition (Informatics '90) to be held in Singapore, 13 to 16 December, 1990. Last year, the exhibition drew some 3400 Australian trade visitors. This year, Martrad is organising travel arrangements as well as pre-registration, background information, special invitations and representation, if required.

For local businessmen, one of the more interesting developments in the past 12 months for doing business internationally was the setting up of a World Trade Centre in Brisbane. Established by Fricker Develop-



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opments, the Centre will link businesses in 182 cities and 49 countries using a network. Managing director Adrian Black said, 'International trading faces barriers of language, distance and ignorance of local conditions and industry. A system like our network moves the entire global business community closer to a single massive marketplace. This emerging era of electronic trading can only benefit a country as traditionally isolated from major markets as Australia.'

Headed by former Expo '88 chairman Sir Llewellyn Edwards, the Centre will be located in a new complex in Eagle St, Brisbane, adjacent to the Riverside Centre. It will include about 2000 square metres of exhibition space, a business club with dining and recreational facilities in addition to conference areas, a library and advisory services. In the meantime, the Centre is providing limited services from the Port Centre, on the corner of Ann and Wharf Sts.

Brisbane software developer Mincom could have made good use of the facilities the Centre will be offering. Newsbytes reported this month that the Union Pacific, the US' largest railway company, has bought software to the value of \$650,000 from the company. The software, called MIMS is to be installed at UP's command centre in Omaha, Nebraska, as part of a US\$75,000,000 upgrade of control operations. Since its introduction to the US market in 1988, over US\$7.5 million of MIMS has been sold there. Managing di-

Police Academy 6, 7, 8 ...

THE QUEENSLAND Police Force has been interested in producing videos for training for some time. But, because an outside production house would have had to be called in, it was well outside the budget. Then, the Force heard of similar work being done on computers and approached United Computers to find out more. The result was a cost-effective system that is being used to produce professional quality training videos for cadets through to the Tactical Response Group. The system, located at the Queensland Police Academy, is also being used to produce public relations support material for the entire state Police Department.

With change from \$15,000, the Department purchased a Commodore Amiga 2000, Pro Video Plus (for generating characters and page transitions), Deluxe Paint (for graphic design), Video Scape 3D (for animation), a genlocker (to link the PC and VCR) and more general software for word-processing, budgeting and accounting. A Bridgeboard was also included to maintain compatibility with the Department's IBM PCs.

rector David Merson noted that 'The acceptance of MIMS is irrefutable evidence that Australian-developed software can compete and win world-wide on its own.'

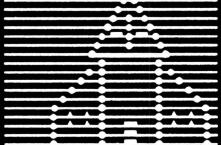
Coming the other way, one 'foreigner' who has established itself successfully in Queensland and is now moving further afield is the Front Line Centre, with its head office in Eight Mile Plains. About 18 months ago, Teuvo Siltala brought out from Finland a low-cost, easy to use network for classrooms, Schoolnet. It's been enthusiastically received in a number of schools here (it's the most widely used school network in Finland) and Front Line is now set to introduce a new system that can handle 98 students (and a teacher) at once on an Ethernet compatible system. Schoolnet has been enthusiastically received by teachers because it gives them the opportunity to work on a one-to-one basis with students without having to leave the desk – they don't even need to be in the same room.

The right thing ...

HERE AT YC we often suggest that users try public domain or Shareware products for particular applications – these packages are often the most cost-effective solution. As anyone who has ever read an opening screen knows, if a Shareware package is found useful, the user is legally (and morally) obligated to forward a registration fee to the author. Sadly, over the years, Australia developed a reputation for recalcitrant users. It reached the point that many authors had decided that their products would no longer be distributed here as Shareware – only commercial copies would be made available.

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Western Computer is the major sponsor of the Queensland University Rugby Union Club, donating financial assistance and the t-shirts to all players and officials of the club – champion Australian fly half Michael Lynagh is pictured (m) accepting the cheque on behalf of the club from Richard Fraser (l), managing director of Western and Richard Sakzewski (r), marketing manager.

Some shady dealers did more than their share of adding to that reputation. However, on a happier note, one man in Queensland did the right thing. As a result, people like Jim Button, whose Buttonware has contributed the likes of PC-File, PC-Write and the Baker's Dozen set of utilities, are again allowing their products into Australia as Shareware. Ian Mackay is the man doing the right thing – his Milton-based company, Manaccomm, distributes public domain and Shareware software via mail order, all over Australia.

Mackay saw that large numbers of users here were going to be denied many of the good things that could be had from these products. After discussions with a number of authors, he undertook to educate the Australian public by means of an advertising campaign and by encouraging other distributors to also do the right thing. It's paid dividends for all of us: these products are again freely (pardon the pun) available.

Queensland, 1990: much of the rest of the world sees itself in a recession, but here the PC industry is basking in sunshine and continuing success! □

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Look at the ads! Any number will tell you that you can buy software for your IBM PC or compatible for only a few dollars. Well, you can't believe everything that you read. These \$5 (or \$4 or \$7 or \$10 or whatever) disks are only for you to evaluate the software - if you wish to use the software you must pay more to the author. This is SHAREWARE and it has revolutionised software distribution.

How it works

Shareware relies upon the honesty of the users of software to pay for the software which they use. To continue using the \$5 (or whatever) disk is a breach of copyright in the same way as using a pirate copy of other software. The great advantage of Shareware is that potential users are able to evaluate a product at little or no cost and then only purchase, or register, if they intend to continue using the product. Registration varies from \$20 to \$200, and because the conventional marketing channels are bypassed this is exceptional value.

Shareware users are even encouraged to copy their software and give a copy to their friends so they too can decide if they would like to use the product, and of course then pay for it. Word would spread slowly if the author solely relied upon users just sharing copies with their friends. User groups are encouraged to share the software with their members on a non profit basis. Many user groups set up Bulletin Boards so that members can "down load" software which they would like to evaluate for use. This is another accepted way of distributing shareware. Some commercial operations also distribute shareware and charge for the disks. The more they can sell the more profit they make so they encourage you to buy the evaluation copies and sometimes "forget" to tell you that if you want to continue using the software that an additional payment is required.

It is fine for these commercial operations to distribute Shareware as long as their ads clearly state that the additional payment is required. Software for \$5 is just too good to be true!

What is Public Domain Software?

Public Domain software is created by authors who chose not to seek formal rights or royalties. There is no restriction of any kind on distribution of this kind of software. Most public domain software is games or utilities. There are very few complete products in the public domain. Shareware software on the other hand is distributed so the user can evaluate the software to decide whether he will register with the author and continue to use the software. Shareware is an alternate method of marketing software, not really a different kind of software. In fact the more successful Shareware products hold their own against their commercially distributed competitors. The greatest difference is that the Shareware product's packaging is not as fancy and the price is much lower.

Where can I obtain Shareware trial disks?

A collection of disks is generally referred to as a Library. A Library may be kept by a user group, a bulletin board operator or by a commercial diskette distributor.

Some education establishments, companies and government departments have a library on a CD-ROM (a large capacity read only disk drive using compact disk technology) and allow students to make copies at no or at a very low cost.

And of course it is quite acceptable for your friends to give you copies of Shareware software that they may be using or have evaluated.

The only restriction is that if you decide to use the software then you should register so that the author is rewarded for his work.

Do I need to join a Library?

Some commercial libraries and most user groups insist that you join before you can purchase disks. If you intend to purchase disks a properly prepared catalogue will make your selections

- Yes, I would like to subscribe to "Shareware" Magazine @ \$20 for 12 months.
- Yes, I would like to have the definitive reference work "The Encyclopedia of Shareware" Vol. I & II at \$39.95.
- I would prefer to save \$29 from bookstore prices and subscribe to "Shareware" magazine and to have the two volumes of "The Encyclopedia of Shareware" for just \$49.95 with FREE post and packing.
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easier and repay your membership costs many times over. Other libraries allow purchases without any membership fees and some offer a free catalogue. The free catalogue is usually a very short description of available disks and is often given away as an insert in magazines. Of course there is no such thing as a free lunch — the brief descriptions in free catalogues mean that you will invariably purchase more disks than you really need. The descriptions are so short you really are taking a lucky dip!

What is PC-SIG?

PC-SIG is the world's most respected Shareware Library and contains well over 2000 disks. PC-SIG does NOT require you to become a member to purchase diskettes but is the leading publisher of information on Shareware. PC-SIG also makes its Library available on CD-ROM for companies, educational bodies and government departments.

Every two months SHAREWARE magazine is available in newsagents at around \$6.50 a copy. The magazine describes new additions to the PC-SIG Library, has comparisons and reviews of available products as well as regular columns. The magazine is also available on a subscription basis at \$20 per annum, a saving of \$19.

"The Encyclopedia of Shareware" is a two volume catalogue with detailed descriptions of the disks in the PC-SIG Library. To make finding the disks you require as easy as possible the disks are grouped by category with extensive indexing. The two volume set is available at selected bookstores and computer shops at \$39.95. If you choose to subscribe to SHAREWARE magazine for just \$20 you can purchase the ENCYCLOPEDIA for only \$29.95, a further saving of \$10, and the post and packing is FREE.

For a total of only \$49.95 you will not only have the best reference work available but you'll be kept up to date for a full twelve months. As a further bonus we offer special discounts to subscribers BUT you do NOT need to be a subscriber to purchase disks. There is no minimum purchase. Our regular prices for trial disks are - single disks \$13, any five disks \$50 and then additional disks in that order for just \$5. Remember though it is easier to select the disks you would like if you have the two volume Encyclopedia and the magazine.

Can Software be Registered in Australia?

PC-SIG's distributor in Australia, Manaccomm offers the full PC-SIG Library and also has arrangements with many authors to represent them in Australia. Yes, the complete registered copies of the best available Shareware products with manuals, telephone support and access to upgrades right here in Australia.

How Good is Shareware?

Registered shareware is used by government departments, corporations and individuals right across the country. There is a full range of products from educational games, to databases, spreadsheets, wordprocessors, accounting systems, and specialised applications. One of the products we distribute was selected against all comers as the best value communications product by the readers of PC-World magazine.

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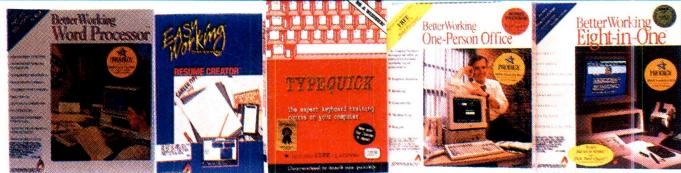


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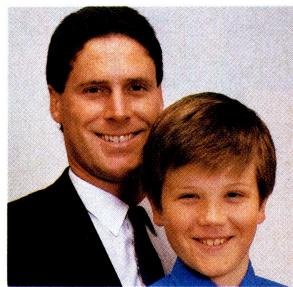


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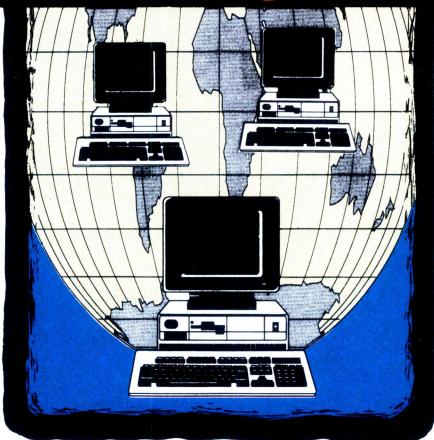
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NEW CONNECTIONS



**EDITED BY
MARK CHEESEMAN**

Discovery at 2400

Telecom's Discovery access is now available at 2400bps, bringing the service into line with the majority of dial-up services and bulletin boards. 'The new speed was introduced to meet the higher speed requirements for professional usage such as rapid database access and large file transfer,' said Maureen Murphy, managing director of Discovery.

'Lower speeds such as 1200bps will continue to run for those customers whose modems don't support higher speeds.'

Discovery's electronic mail and file transfer facilities support the CCITT X.400 standard, and connects subscribers both locally and internationally in 10 other countries. More countries are expected to be available in the near future. Subscribers are also able to send telexes and faxes, and transfer files to other Discovery users.

Off-line messaging means that users do not accrue on-line charges while reading messages. Outgoing messages are keyed in before dialing Discovery, and then uploaded at the maximum possible rate when connected to the service. Similarly, incoming messages can be downloaded, and read later at the user's leisure.

Discovery also has several BBS-style conferences, covering a range of topics. Interested parties can post messages to a particular conference in the same way as bulletin boards and other electronic messaging systems. It also provides access to many on-line databases, such as the Dow Jones financial database, and a range of electronic magazines. There's even a comprehensive electronic travel information

service - the Official Airline Guide.

For more information call Discovery, toll-free, (008) 033 342.

LaserJet printing for Novell

Hewlett-Packard has announced a new solution for LaserJet printers on Novell networks. Supporting the LaserJet series II, IID, III and 2000 printers, the LAN connection is claimed to be the only such solution to be Novell Labs approved. Sitting under the printer, and connecting to its parallel port, the HP 33480A LAN connection provides printer status information, such as on- or off-line, and paper status. Print spooling functions are provided by the file server, as usual.

The LAN connection allows printers to be located near the users who are using the printer, rather than being restricted to being cabled to the server - an important consideration for parallel printers, with their restricted cable lengths. This is especially important where the LAN spans a large physical area, or when the server is located in a secure room, away from the users of the system.

The HP LAN connection is compatible with V1.2 of NetWare's Print Server, which is shipping with the latest revision of Advanced and SFT NetWare V2.15, and with Netware 386 V3.1. Priced at \$1661, the

LAN connection supports both thick and thin EtherNet, and future releases will support the IBM Token Ring topology, and we are told a LAN Manager version is on the way.

For more information contact HP, (008) 033 821.

NetComm introduces MNP-5

NetComm has started shipping its popular M4 and M5 modems with MNP level 5 data compression. The modems previously had MNP level 4 error correction (which also gives a slight improvement in speed), and the inclusion of level 5 brings data compression ratios of up to 2:1. This means that the V.32 M5 can achieve throughputs of up to 19.2kbps, depending on the content of the data. The modems support speeds of 300, 1200/75, 1200 and 2400bps, and the M5 adds to this the V.32 rates of 4800 and 9600bps. MNP can be used at any of the rates from 1200bps up, using either level 4, or both level 4 and level 5.

Pricing for the new modems is \$1199 for the M4, and \$1999 for the M5. Owners of previous models can obtain a ROM upgrade for \$100 to gain the MNP-5 protocol, and current M4 owners can upgrade to the new M5 for \$1000. For more details, contact NetComm, on (02) 888 5533.



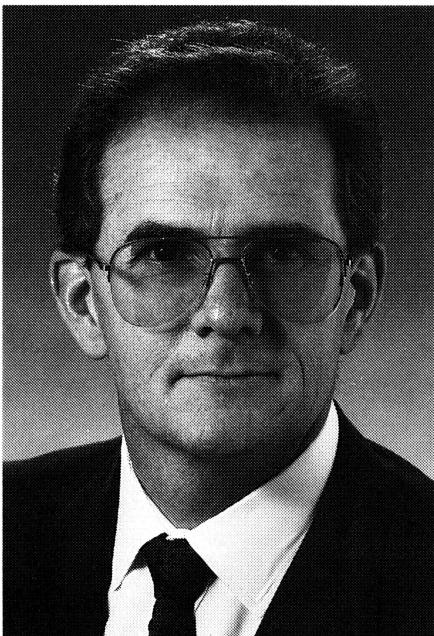
HP's new LAN connection allows LaserJet printers to be located close to workstations, even in a secure-server environment.

New WAN tools

NetComm's new LAN division has announced the introduction of a series of new communications tools from Newport Systems Solutions, for wide area networking.

These include new products in that company's range of LAN²LAN routers. The routers connect Novell Advanced Netware servers and external bridges, at speeds of up to 64kbps, or 2Mbps, with the LAN²LAN/Mega version, and work with Micro Channel computers, supplementing the existing ISA bus variant. Pricing ranges from \$5495 up to \$11,650, depending on the exact model.

For more detailed information, contact NetComm, on (02) 888 5533.



NetComm's Chris Howells believes the V.32 will be the standard choice for frequent modem users in 12 months time.

New direction for NetComm

NetComm managing director Chris Howells announced a new corporate direction, aimed at making his company the dominant force in Australian connectivity.

'Selling only through resellers and di-

recting our support through them, we are poised to become the largest, and most versatile systems integrator in Australia – possibly the first multi-systems integrator,' said Howells.

'We also have two levels of experience that we can bring to the broader connectivity marketplace – which I believe will be the most volatile and fastest growing area of the PC, communications and distributed processing markets over the next five years,' he added.

'Firstly, we have consolidated our experience in the networking field by importing to Australia, and supporting some of the finest products over a period of several years. We are already well-known in the market with Farallon and Tri-data, and are expanding our offerings with products from Dayna Communications and Microphone from Software Ventures.

'Secondly, we've lived right through the PC revolution. We've seen high profile players come and go – we've seen resellers try to add value to basic box-moving operations before the market was prepared to pay for it; and without the financial strength to build lasting positions.

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NEW CONNECTIONS

'NetComm, on the other hand, is addressing the connectivity market from a position of strength – last year we grossed about \$20 million, with revenue funding, low debt and some emerging export prospects.

'NetComm's new LAN division, based around the recently acquired Micro Networks, and other businesses, is already looking to make other acquisitions in this area.

'We are already discussing local manufacturing of some network products, for which we planned production capacity prior to our major infrastructure investment last year. So, with manufacturing, we can enhance our margins in the LAN/WAN area. And, we can potentially develop products from specialist areas such as OEM.'

Howells, a vocal critic of the federal government's policies towards local manufacturers in the past, did not let this opportunity pass without again attacking what he called 'a big-business government'. He cited the recent subsidies to Du Pont and Kodak, and contrasts this support to the lack of support for the ailing Labtam, once the number 14 exporter among Australian-controlled and Australian-based companies.

NetComm has also released a new version of Timbuktu, Farallon's popular package for screen sharing and file transfers. Version 3.1 builds upon previous releases, allowing multiple Macintoshes to be simultaneously monitored and controlled, each in a separate, resizable, window.

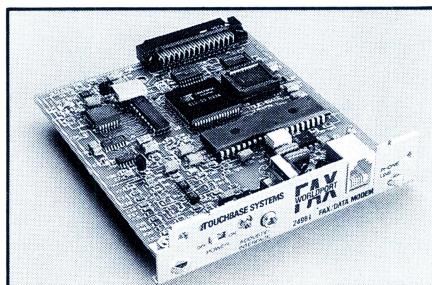
All windows are continually updated, regardless of which window is currently active. File transfer speeds have also been improved, up to seven times better than the previous version. The only limit on the number of windows on-screen is the memory in the Mac – each host session required between 30- and 50K of RAM.

A single user version of Timbuktu is priced at \$199, while a 10-pack is \$1599, and \$2999 will buy the software for 30 machines. Free upgrades are also available for registered users of version 3.0. For details, contact NetComm, (02) 888 5533.

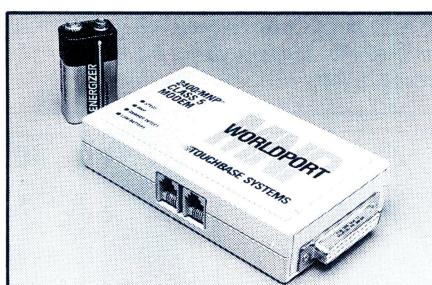
Two new modems for laptops

Dataplex, the Australian agent for Touchbase systems' Worldport communications products, has announced the availability of two new modem products designed for

laptop users. The Worldport 2496iT modem is an internal fax/data modem for internal mounting in Toshiba laptops. Offering full data communications capabilities up to 2400bps, and Group III fax send and receive operations at up to 9600bps, in conjunction with supplied software which runs either in the foreground or background.



The Worldport 2496iT offers 2400bps data and 9600bps fax capabilities in a single, internal unit for Toshiba laptops.



A pocket modem with MNP level 5 data compression – the Worldport 2400/MNP.

Incoming calls are automatically recognised as data or fax, and the menu-driven software includes a built-in text editor, cover sheet broadcasting, a bulletin board system, delayed transmission and group broadcasts. A combined fax/data dialing directory stores called numbers, and an acoustic coupler interface is provided, for hotels with digital PBXs, or public phone boxes.

The Worldport 2400/MNP adds MNP-5 data compression and error correction to the external Bell/CCITT 2400bps modem, and is claimed to be the smallest MNP-equipped modem on the market. The modem connects to a standard RS-232C serial port, and includes a constant-speed interface, speaker and LED indicators, standard AT command set, and battery operation.

The 2496iT card fits in the internal modem 'A-slot' of most Toshiba laptops.

and is priced at \$1320, while the 2400/MNP is \$769. For more details call Dataplex, (03) 735 3333.

OTC to provide ISDN

OTC's first services using ISDN technology were recently launched by the minister of transport and communications, Kim Beazley, and OTC's managing director, Steve Burdon. OTC's Switched Digital provides on-demand data and image channels to the US and Japan, and is aimed at business users for use as a backup to existing leased-line services. The service can also be used for video conferencing, group 4 fax, and high-speed file transfer operations.

'We are among the first carriers in the world to introduce an ISDN-based service,' said Burdon. The service will be extended later this year to New Zealand, the UK, Hong Kong and Singapore. France, Sweden, Germany, Italy and Canada should be available in early 1991. Additional ISDN features will be available to business customers when its new 12,000 line facility in Paddington, Sydney, is completed next year.

Networking handbook

Logo Distribution Services has launched a free guide to networking – *Handbook of PC Connectivity Solutions* – for use by dealers and end users. It is intended to give the networking novice a complete guide to the wide range of PC connectivity devices, from simple printer switching devices through to LANs and WANs.

'The whole concept of networking can be a frightening one for the uninitiated,' said Peter Klanberck, Logo's managing director. 'With so many products available on the market to increase PC connectivity, we felt that it was time to tear away some of the mystery surrounding this topic, and help our customers to make successful and cost-effective decisions about what they really need from a network.'

For more information contact Logo, (02) 819 6811, or fax (02) 819 6930.

NewWave under NetWare

Hewlett-Packard and Novell are to develop a shared version of the NewWave operating system, which allows multiple users to use the system on a network run-

MicroGram COMPUTERS

DIGITAL I/O CARD

- * 48 Digital I/O lines programmable as input or output.
- * 16 channels have LED status display.
- * 3 independent 16 bit counters. \$135.00

EGA CARDS

- * CGA, EGA and Hercules compatible with 256kb RAM \$160.00

EPROM WRITER CARD

- * Programs 2716, 2732, 2732A, 2764, 2764A, 27128, 27128A, 27256, 27356A, 27512, 27512A.
- * Read EPROMS and save to disk.
- * Read from disk and write to EPROM.
- * Modify EPROM.
- * Blank check.

Single burner	\$190.00
Four burner	\$360.00
Eight burner	\$670.00

ALSO AVAILABLE

- * 8748/49/50/41/42 Writer Card \$650.00
- * Bi-polar PROM Writer Card \$585.00
- * PAL Programmer Card \$650.00
- * Universal Programmer \$1460.00

EEMS CARDS

- * Capacity 2Mb per card, 4 cards per system
- * Will backfill conventional memory to 640kb.
- * Compatible with EMS and EEMS memory to run with Lotus 1-2-3, DESQview II etc.
- * Driver software included as well as print buffer and RAM disk utilities. (includes LIM 4)
- * XT or AT versions 0kb RAM \$230.00

TVM MONITOR PARTS

- * Fly back transformers, power supplies and circuit diagrams to suit MD3, MD300, MD7, MD700 and MD11 monitors.

BAR CODE READERS

- * Selectable keyboard interface (connects between keyboard and computer) or serial interface.
- * Bi-directional scanning.
- * Will autodiscriminate most barcode symbologies eg. UPC/EAN/JAN/Code 39/Interleaved 2 of 5.
- * Barcode printing software included. \$450.00
- * Barcode slot reader with above features. \$615.00

"EXTERNAL" FLOPPY DRIVE CONTROLLER

- * Allows two additional floppy disk drives to be fitted (beyond A: and B:)
- * Supports 360/720/1.2/1.44 on both XT and AT computers
- * No need to replace existing hard disk floppy disk controller cards
- * "External" drive(s) may be mounted internally with 34 pin header and ribbon cable or externally via 37 pin D connector. \$135.00

5m PRINTER CABLE

- * Standard IBM printer cable 5m long \$30.00

TOPWARE LAN OPERATING SYSTEM

- * Network up to 64 computers.
- * 10Mb/sec Ethernet interface cards.
- * Supports record locking with multi-user software.
- * Supports file locking with single user software.
- * Network software users familiar DOS commands.
- * Shares all file server hard disks.
- * Shares printers anywhere on the network and allows output redirection with popup utility.
- * Starter kit (Two interface cards, coax cable, connectors, software and manual). \$1100.00

COMPUTER TERMINAL

- * Compatible with PC Term, ANSI and DEC VT220 terminals.
- * Uses standard PC monochrome monitor.
- * Provides standard PARALLEL printer port.
- * Suitable for use with Concurrent DOS, PC-MOS/386, MERGE 386, SCO XENIX, UNIX, THEOS, DEC VAX. Price excl. KB & Monitor \$510.00

AT DIAGNOSTIC CARD

- * Plug into motherboard expansion slot and switch on.
 - * Error code is shown on LED display indicating failure of one 59 possible tests.
 - * Where appropriate the manual indicates the area of circuitry and / or the suspect IC associated with the error code.
- \$150.00

VOICE CARD

- * Digitally store a human voice on disk.
- * Playback through your own programs.
- * 10 Bit sampling at 16K or 32K bits/sec.
- * Store approx. 1.5 hours on 20Mb Hard Disk
- * Sample programs in C, Pascal, Basic and Dbase III, provided
- * Microphone and speaker included. \$145.00
- * Additional stand-alone card to play back 16 messages stored in EPROM \$149.00

KEYPAD FOR LAPTOPS

- * Provides an external cursor pad for Laptop computers.
- * Plugs into 9 pin RS232C port.
- * Software directs keypresses to keyboard buffer. \$160.00

SOUND CARD FOR SIERRA GAMES

- * Provides stereophonic sound effects for Sierra and compatible games.
- \$255.00

ADAPTERS AND TESTERS

- * AT keyboard to PS/2 adapters \$23.00
- * Centronics gender changer F/F \$12.00
- * Centronics gender changer M/M \$12.00
- * DB9/DB25 Adapter F/M \$12.00
- * DB9 gender changer F/F \$11.00
- * DB9 gender changer M/M \$11.00
- * High density DB15 F/F \$14.00
- * High density DB15 M/M \$14.00
- * High density DB15/DB9 M/F \$12.00
- * Null Modem DB25 M/F \$10.00
- * Gender changer DB25 F/F \$10.00
- * Gender changer DB25 M/M \$10.00
- * RS232 Loopback tester DB25 M/F \$20.00
- * RS232 Pin 2/3 reverser DB25 M/F \$11.00
- * RS232 Surge Protector DB25 M/F \$20.00
- * RS232 Mini wiring box DB25 M/F \$25.00
- * RS232 Mini tester DB25 M/F \$60.00
- * RS232/RS422 Converter DB25 M/F \$60.00
- * RS232 to Current Loop \$190.00
- * RS232 to RS422/485 \$190.00
- * Parallel/serial converter \$105.00
- * Serial/parallel converter \$105.00

SOFTWARE SECURITY KEY

- * Protect your software from unauthorised copying.
- * Consists of an ASIC based hardware device.
- * Hardware is fitted to a parallel port and is transport to printers.
- * Allows unlimited backups and software can run from hard-disk. \$75.00

PS/2 MOUSE

- * A two button mouse compatible with the IBM PS/2 computers.
 - * Tracking speed 500 mm/s
 - * Resolution 200dpi
 - * Includes driver software
- \$139.00

BUS MOUSE

- * A three button bus mouse compatible with the IBM XT/AT computers and compatibles
- * Bus interface card included
- * Microsoft Mouse and Mouse Systems Mouse Compatible
- * Includes driver software and menu maker software \$120.00

PARALLEL PRINTER EXTENDER

- * Allows a standard parallel printer to be operated at up to 1200m from the host computer
- * Users standard RJ11 connector with 6 core telephone cable
- * Transfer rate 22.5kb/sec
- * Kit includes transmitter, receiver and 10m cable \$165.00

All prices include Sales Tax.

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Phone: (043) 34 1544

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ning NetWare. This extends the network support of NewWave, which is already supported on TCP/IP, OSI, and LAN Manager/X networks.

'With this announcement, HP NewWave customers can distribute resources and applications using the network operating system with the largest installed base in the industry,' said HP's information networks group general manager, Robert Frankenberg.

'Novell and HP possess complementary technical expertise. Novell will provide network expertise to HP for the distributed HP NewWave architecture and future HP products. HP will provide object-management expertise to Novell to develop future Novell products,' he said.

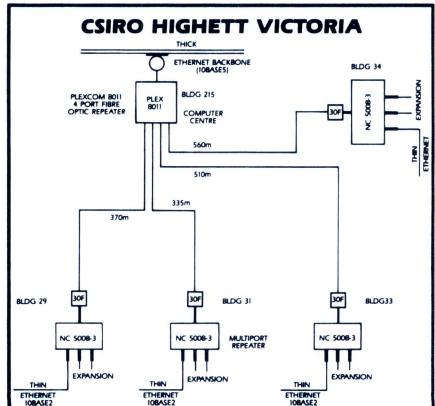
HP and Novell will work to provide an easy migration path for NetWare's integration into the HP NewWave environment with minimal engineering effort. Novell will recommend the HP NewWave software environment to its customers.

More details can be obtained from Hewlett-Packard, (008) 033 821.

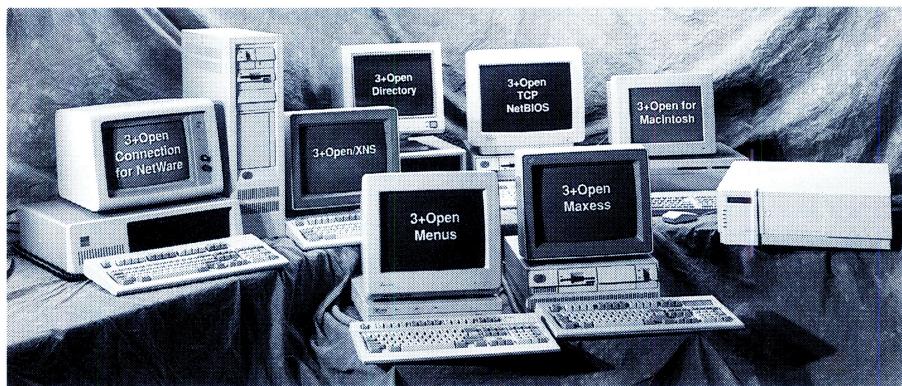
Fibre optic backbone for CSIRO

ADE Network Technology has recently installed a fibre optic network at CSIRO's Highett site in Victoria. Constantly hampered by lightning, the decision was made to interconnect four remote buildings to the Ethernet backbone in the computer centre.

A Plexcom 8011 five port fibre optic repeater was located in the computer centre, with a fibre optic cable connecting to a Netcor NC-30F fibre optic transceiver in



CSIRO's fibre optic backbone ties the Highett site together, with safety from lightning strikes.



3Com's new range of networking products allows network users to access services on OS/2 and Unix hosts, as well as supporting the TCP/IP and XNS protocols.

each of the remote buildings. Each NC-30F is in turn connected to an NC 500B-3 multi-port repeater, providing three thin Ethernet ports and one AUI (thick Ethernet), for future expansion.

The 8011 is a modular unit, allowing for future expansion. The network interconnects the organisation's PCs, Macs, Sun workstations and fileservers, and some Unix boxes, including a Pyramid.

For more information, contact ADE, (03) 543 2677.

New 3Com products

3Com has announced two new products which enable users of 3+Open networks to inter-operate transparently with NetWare and Mac systems. 3+Open Connection for NetWare allows LAN Manager and Novell systems to operate as a single network, giving users access to files and applications in both environments. 3+Open for the Macintosh allows Macs to act as clients in 3+Open networks, along with Dos and OS/2 workstations, giving Mac users direct access to LAN Manager resources for the first time.

With 3+Open Connection for NetWare applications written to Novell's IPX protocol, will work unaltered in a NetWare environment. In addition, NetWare users, through DPA, have access to 3+Open LAN Manager applications such as 3+Open Mail, 3+Open Internet, and 3+Open TCP with DPA.

3+Open for the Macintosh uses Apple-Share client software, allowing Mac users to use the system without retraining. Existing 3Com electronic mail products are supported, allowing Mac and PC users to communicate with each other.

In addition, two other new products give network users access to OS/2 and Unix servers, and hosts running TCP/IP and XNS protocols. 3+Open TCP NetBIOS allows resource sharing within multi-operating system networks, by incorporating NetBIOS functionality with the TCP/IP protocol. 3+Open XNS provides similar functionality for users (XNS) networks.

For pricing and availability information, contact 3Com, (02) 959 3020.

NetWare 386 communications support

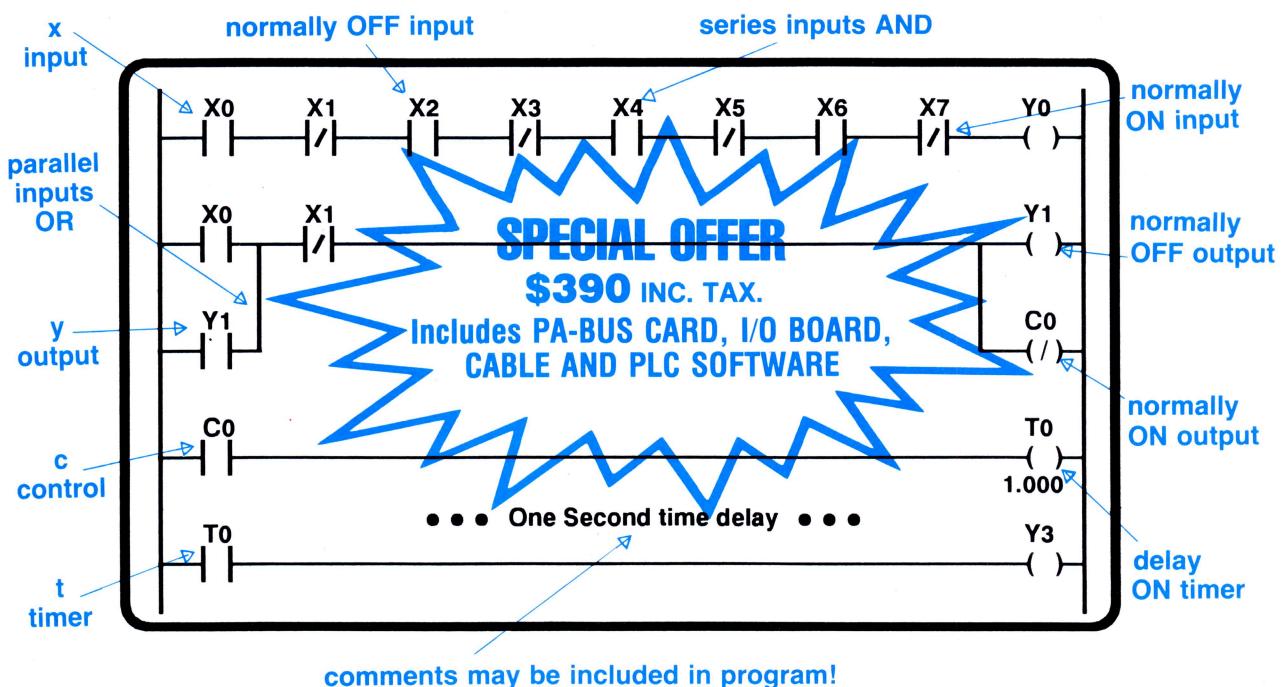
Novell's NetWare 386 Services for SAA v1.0, a software module which includes the NetWare 386 operating system kernel, is a communications server for business-wide information sharing. The server provides comprehensive IBM connectivity, giving access to a wide variety of IBM applications, such as OfficeVision, NetView, and DB2. In addition, it supports IBM's distributed applications environment and includes access to AS/400 applications.

NetWare 386 Services for SAA allows a single NetWare server to access multiple IBM hosts, supporting up to a massive 1000 simultaneous host sessions. An IBM NetView network management interface is provided, allowing MIS personnel to monitor NetWare 386 Services from a NetView management console on the host.

Novell has also released three new software products for linking networks to IBM hosts - NetWare 3270 LAN Workstations for Windows, NetWare 3270 LAN Workstations for Macintosh, and NetWare 3270 LAN Workstations for Dos, version 2.0.

For details, contact Novell, (02) 413 3077.

PROGRAMMABLE CONTROL



Programmable control from your IBM-PC or compatible? Imagine being able to write and test logic control programs as easily as switching on a light bulb. Procon Technology has done just that with its PLC version 2.0 software. This program provides a relay ladder logic style of programming – shown above – that's easy to learn and easy to understand. What's more, it's the style of language used in multitudes of industrial controllers worldwide!

Together with our I/O board, this software turns your PC at home or in the office, school or laboratory into a powerful, yet flexible, programmable controller. Your computer becomes the centre of the control system – it monitors the inputs, scans and solves logic and performs other special functions to determine and set the output conditions.

The PLC editor facilitates the entering, deleting and altering of comments and ladders off-line or on-line. On-line editing allows modifications to be made to the program without disruption to the

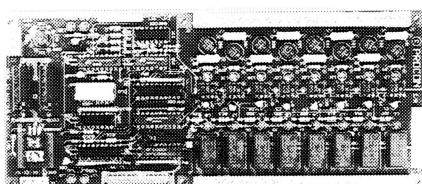
control operations. E.g. You could adjust a time delay, correct a logic error or add more functions whilst the program continues to run – uninterrupted.

Unlike other programming languages, PLC version 2.0 also provides real-time indication of logic conditions continuously on the screen – again with no interruption to program execution. Each closed contact or activated output is highlighted on the screen and each timer's remaining duration is displayed. Monitoring and debugging control programs couldn't be easier!

Once a program has been debugged, it can then be loaded for execution in background whilst the computer is used for other things (such as word-processing or spreadsheets).

With additional I/O boards, numerous PLC application programs may run in the background providing an economical means of controlling many different items of equipment.

Applications include: Home or business automation and security systems, model control, laboratory automation and educational and training needs.



The NR-12VAC I/O board is mounted externally (up to 30 metres from the computer) and provides 8 isolated 12 Volt AC or DC inputs and 8 inde-

pendent relay outputs. LED indication is provided on all inputs and outputs and all connections are via screw terminals. The system is capable of expanding to 240 I/O from one PA-BUS card inserted into a single card slot in the computer.

Other I/O options are available, including an industrial version. The I/O boards may also be controlled from other high-level languages.

VISA, BC, MC accepted.

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Mt. Waverley, VIC 3149

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WIN A WESTERN 386-16SX PLUS SOFTWARE.

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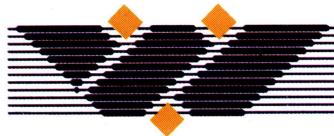


CONDITIONS OF ENTRY: 1. The competition is open only to Australian residents whose correct entries are received before last mail 31/10/90. Entries received after closing date will not be included. Employees of the Federal Publishing Company Pty Ltd, Western Computers Pty Ltd and their families are not eligible to enter. 2. South Australian residents need not purchase a magazine to enter, but may enter only once by submitting their name, address and a hand-drawn facsimile of any of the coupons to Federal Publishing Company Pty Ltd, P.O. Box 227, Waterloo NSW 2107. 3. Prizes are not transferable or exchangeable and may not be converted to cash. 4. The judge's decision is final and no correspondence will be entered into. 5. Description of the competition and instructions on how to enter form a part of the competition conditions. 6. The competition commences on 20/7/90 and closes with last mail on 31/10/90. The draw will take place in Sydney on 7/11/90 and the winner will be notified by telephone and letter. The winner will also be announced in The Australian on 14/11/90 and a later issue of Your Computer magazine. 7. The prize is: One only Western 386-16SX computer in a desk top or mini tower case with power supply, floppy disk drives and hard disk drive, VGA card, mouse and monitor. Software is also included. Total prize value \$8,974.00. 8. The promoter is: The Federal Publishing Company Pty Ltd, 180 Bourke Road, Alexandria NSW 2105. Permit No. TC90/0000 issued under the Lotteries and Art Unions Act 1901; Raffles and Bingo Permit Board Permit No. 90/0000 issued on 00/00/90; ACT Permit No. TP90/0000 issued under the Lotteries Ordinance, 1964.

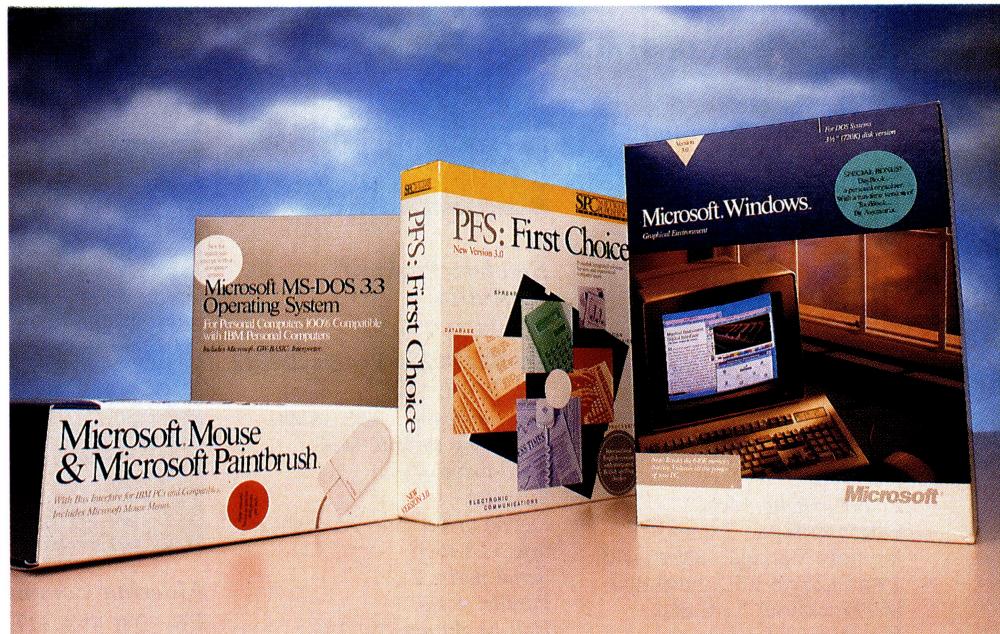
◆◆◆◆◆ THE
WESTERN
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C O M P U T E R

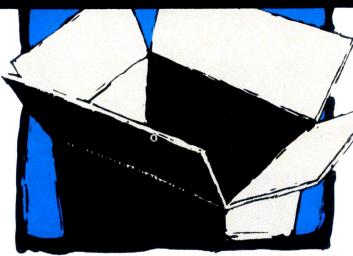


The system consists of a Western 386-16SX computer in a mini desk top or mini tower case with 200w power supply, 1 × 3½ inch, 1.44MB and 1 × 5¼ inch 1.2MB floppy disk drives, a 70MB Micropolis hard disk drive, VGA card, Microsoft bus mouse and an NEC Multisync monitor.



Enter today — simply complete your details on the official entry form attached and post it.
Who knows, you could win and enter the colourful world of power computing.
For further information on Western Computers phone (07) 262-3122 or fax (07) 262-4957.

RELEASE UPDATES



Desktop Machines

Compaq Update



Compaq Australia

Ph: (02) 660 0077
Fax: (02) 660 3120

20MHz 80386SX Deskpro 386s/20

Std. RAM: 2Mb
Max. onboard RAM: 16Mb
Operating system: Compaq Dos 3 or 4
Hard drive: 19ms 60Mb, ESDI
Disk Cache: 4K
Bus: ISA
Floppy drive: One 3.5-inch
Serial ports: 2
Parallel ports: 1
Half-height devices: 5 (3 external access)
Monitor: 14-inch VGA
Expansion slots: 4 16-bit (all free)
Power supply: 140W
Other: Compaq Expanded Memory Manager; \$8795 with 19ms 120Mb ESDI hard disk; \$5995 without hard disk
Warranty: 12-months
Price (rrp): \$7395

Dario Update

Triumph-Adler Olivetti

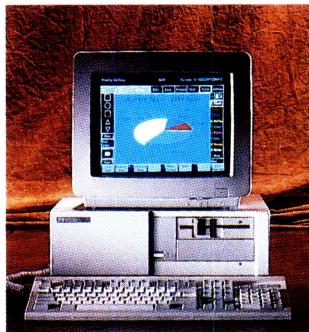
Ph: (02) 748 2600
Fax: (02) 748 3390

12MHz 80286 Dario 286 AT

Std. RAM: 1Mb

Max. onboard RAM: 4Mb
Operating system: Dos 3.3
Hard drive: 28ms 20Mb
Disk Cache: No
Bus: ISA
Floppy drive: One 3.5-inch
Serial ports: 1
Parallel ports: 1
Half-height devices: 3 external access
Monitor: 14-inch monochrome VGA
Expansion slots: 3 16-bit (all free)
Power supply: N/S
Other: \$3095 with 40Mb hard disk; add \$400 for color VGA
Warranty: 12-months
Price (rrp): \$2895

Hewlett-Packard Update



Hewlett-Packard Australia

Ph: (008) 033 821
12MHz 80286 Vectra 286/12
Std. RAM: 1Mb
Max. onboard RAM: 16Mb
Operating system: Dos
Hard drive: 42Mb
Bus: ISA
Floppy drive: One 3.5-inch or one 5.25-inch
Serial ports: 2
Parallel ports: 1
Half-height devices: 3 (2 external access)
Monitor: 14-inch VGA
Expansion slots: N/S
Power supply: N/S
Other: \$3295 no hard disk; \$3595 with 19ms 20Mb hard drive
Warranty: 12-months
Price (rrp): \$4395

IIS Update

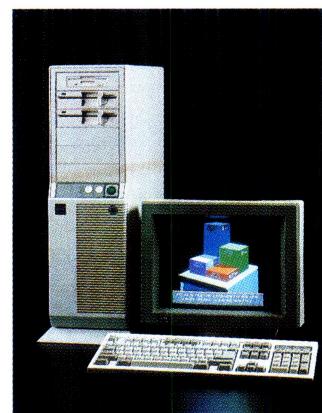


Macrina Computers

Ph: (03) 543 3272

16MHz 80386SX IIS-816

Std. RAM: 1Mb
Max. onboard RAM: 8Mb
Operating system: Dos
Hard drive: 40Mb
Bus: ISA
Floppy drive: One 5.25-inch
Serial ports: 2
Parallel ports: 1
Half-height devices: 3 external access
Monitor: 14-inch VGA
Expansion slots: 2 8-bit; 6 16-bit
Power supply: 200W
Warranty: N/S
Price (rrp): \$3150



Macrina Computers

Ph: (03) 453 3272

33MHz 80386 IIS-633

Std. RAM: 1Mb
Max. onboard RAM: 16Mb
Operating system: Dos
Hard drive: 40Mb
Disk Cache: 64K
Bus: ISA
Floppy drive: One 3.5-inch; two 5.25-inch

Serial ports: 2
Parallel ports: 1
Half-height devices: 6 (all external access)
Monitor: 14-inch VGA
Expansion slots: 2 8-bit; 5 16-bit; 1 32-bit
Power supply: 220W
Warranty: N/S
Price (rrp): \$4900

Olivetti Update



Triumph-Adler Olivetti

Ph: (02) 748 2600
Fax: (02) 748 3390

16MHz 80286 M290S AT

Std. RAM: 1Mb
Max. onboard RAM: 5Mb
Operating system: Dos 4.0
Hard drive: 40Mb
Disk Cache: No
Bus: ISA
Floppy drive: One 5.25-inch
Serial ports: 2
Parallel ports: 1
Half-height devices: 3 (all external access)
Monitor: 14-inch VGA
Expansion slots: 3 1-bit
Power supply: N/S
Other: 100Mb hard disk optional
Warranty: 12-months
Price (rrp): \$5354

Philips Update

Philips TDS

Ph: (02) 805 4444
Fax: (02) 925 3333

20MHz 80386 P3350

Std. RAM: 1Mb
Max. onboard RAM: 16Mb
Operating system: Dos 4.01

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If you purchase a Maestro Modem, your name goes
into a barrel.
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2400 DATA OPTIMIZER - MNP Level 5 Modem

Includes Error Correction and Data Compression

V.22 - V.22 bis - MNP Mode 5 data compression with Hayes compatibility, auto dial, auto answer, auto disconnect with error checking. This modem is capable of quadrupling the data flow with MNP Mode 5.

Depending on the file you can reach a staggering 9600 bps peak compression - error free!

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Call Progress Monitoring, Pulse / Tone Dialling,
Line Condition Monitoring, Hayes Compatible.
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1200/1200, 2400/2400)
V.23 with automatic bit rate converter

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Now Available in Kit Form

The ULTIMATE feed-back
device for your keyboard.



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Incl Tax



9600 BPS

\$995 Incl Tax (Avail 1/ '90)

V.32 Super Executive

V.32 9600 FULL DUPLEX
on a standard telephone line

1200 Bit Stream

Flyer

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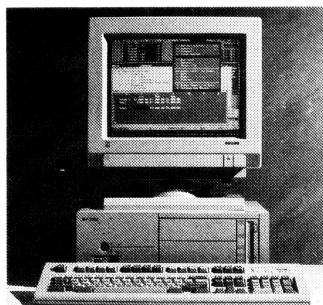
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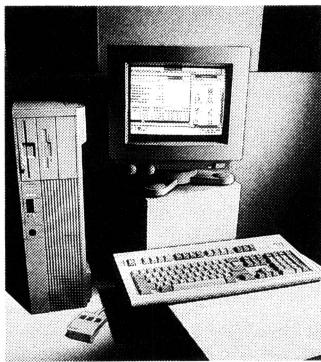
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RELEASE UPDATES



Hard drive: 25ms 100Mb
Disk Cache: 32K
Bus: ISA
Floppy drive: One 3.5-inch
Serial ports: 1
Parallel ports: 1
Half-height devices: 4 (3 external access)
Monitor: 14-inch VGA
Expansion slots: N/S
Power supply: N/S
Other: 15-hour tutorial
Warranty: 12-months
Price (rrp): \$8945

Wang Update



Wang Australia
Ph: (02) 925 5678
Fax: (02) 957 5290
33MHz 80386 PC380/33C
Std. RAM: 1Mb
Max. onboard RAM: 16Mb
Operating system: Dos; OS/2; Unix
Hard drive: 28ms 20Mb IDE
Bus: ISA
Floppy drive: One 3.5-inch or one 5.25-inch
Serial ports: 2
Parallel ports: 1
Half-height devices: 4 (3 external access)
Monitor: Optional
Expansion slots: 8 16-bit

Power supply: 240W
Other: Wang Expanded Memory Manager; optional 18ms 321Mb ESDI hard disk
Warranty: 12-months
Price (rrp): \$6340

Laptops & Portables

Compaq Update



Compaq Australia

Ph: (02) 660 0077
Fax: (02) 660 3120

16MHz 80386SX SLT 386s/20

Std. RAM: 2Mb
Max. onboard RAM: 14Mb
Operating system: Dos 3 or 4
Hard drive: 19ms 60Mb
Disk Cache: 4K
Bus: ISA
Floppy drive: One 3.5-inch
Serial ports: 1
Parallel ports: 1
Other I/O: Plug for external drive
Expansion slots: 1 16-bit
Weight: 6.4kg
Power: Battery/mains
Other: Optional internal 2400 baud modem; \$10,595 with 19ms 120Mb hard drive
Warranty: 12-months
Price (rrp): \$9295

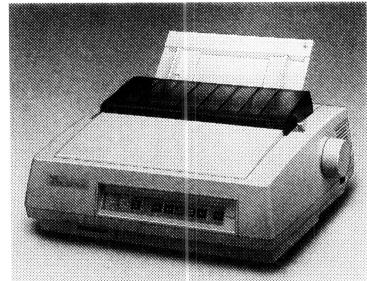
Zenith Update



Zenith Data Systems
Ph: (02) 417 7999

10MHz 80C88 MinisPort HD

Std. RAM: 1Mb
Max. onboard RAM: N/S
Operating system: Dos 3.3
Hard drive: 23ms 20Mb
Bus: ISA
Floppy drive: External 3.5-inch
Serial ports: 1
Parallel ports: 1
Other I/O: External monitor
Weight: 3kg
Power: Battery/mains
Other: FastLynx LX and cable
Warranty: 12-months
Price (rrp): \$4999



draft: 100cps LQ
Rated noise (working): 54dBa
Compatibility: IBM
Carriage width: 9-inch
Dots per character: 2 x 12
Pitch: 10, 12, 15, 20
Resident typefaces: 4
Graphics resolution: 360 x 360dpi
Data buffer: 48K
Other: Optional ROM card for additional fonts; bottom feed with optional pull tractor
Warranty: 12-months
Price (rrp): \$1115

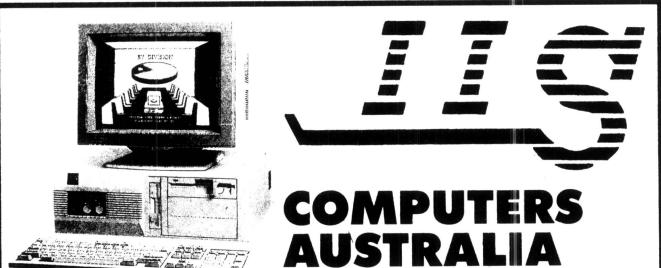
Dot Matrix Printers

NEC Update

Nec Information Systems
Ph: (02) 438 3544

24-pin Pinwriter P6200

Rated speed (10cpi): 300cps



IIS
COMPUTERS AUSTRALIA

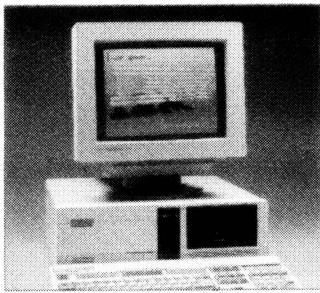
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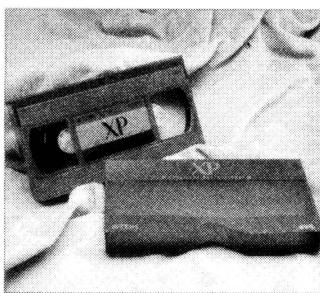
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Desktop Video?

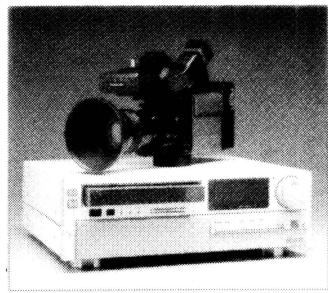
Can Do!



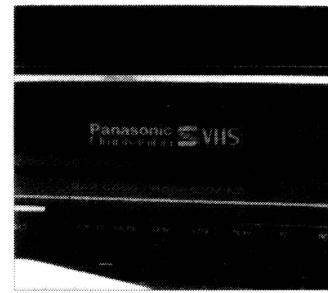
AT-COMPATIBLE



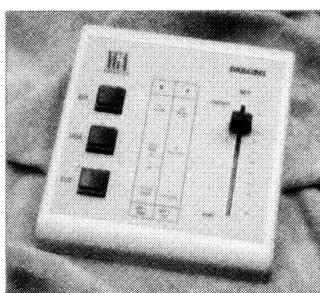
PAL/VHS



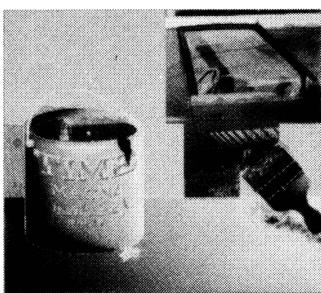
BROADCAST QUALITY



S-VHS



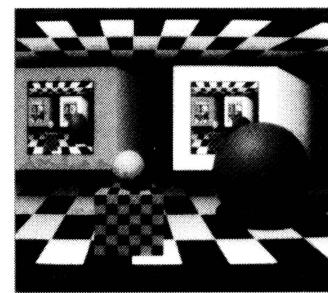
TRANSITION EFFECTS



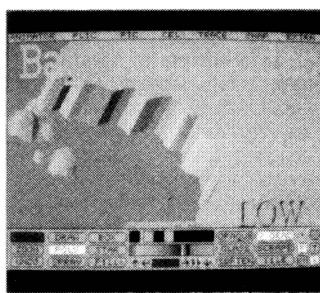
OVERLAY (ANY-COLOR KEY)



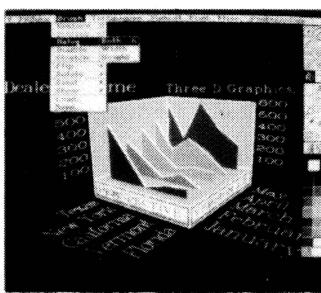
FADE



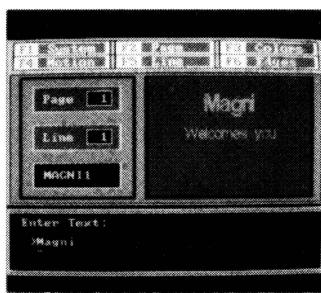
640 x 480 256 COLORS



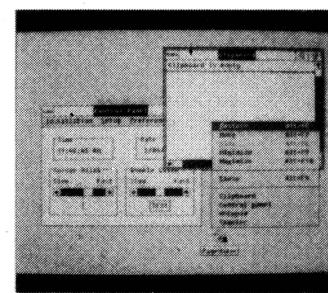
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PC Magazine
28 Nov 1989

Call us today for more information on the professional's choice for VGA encoding.



July 1990
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Engineering Emmy
Award Recipient

Ami Pro v1.2

Windows 3.0 applications are starting to come out of the woodwork, and one of the first is the upgraded version of Ami Pro. As I wrote in my review of this program in August, Ami Pro can change your life, or at least your attitude to desktop publishing, wordprocessing and charting.

However, things didn't run as smoothly as I would have expected – for starters, while Windows 3.0 ran reasonably well, Ami Pro 1.2 sure didn't. It was *oh so slow*, it was hanging the computer, it did everything but work. But because it was so bad, I realised that something was wrong with my system, not with the software. As it turned out, several things were contributing to the problems, including a degree of ignorance on my part. I now know not to have a RAM drive installed, as this takes my available RAM below the 2Mb limit required to run Windows in enhanced mode. When I disabled the RAM drive, things improved markedly, but not to the point of perfection. Fortunately, by now I had seen Ami Pro 1.2 working on a number of systems, and I can assure readers that it runs much faster than before. As well, it includes several enhancements over the previous versions. My remaining conflicts include a disk manager program and possibly a hard drive interface incompatibility.

The disk manager program won't allow Smartdrive to operate, which slows the Windows environment, and my hard disk interface may be introducing other problems that have yet to be resolved. In other words, because so many third party operators have their fingers in the IBM compatible market, sophisticated software like Windows sometimes runs into problems. The answer is to read the manual carefully.

and to purchase hardware that is supported by your BIOS. The new version of Ami Pro looks similar to the old, as most of the changes are improvements rather than additions. For example, function keys F11 and F12 are now included in the style sheets, tables can be copied from one page to another far more easily and there are additional import/export filters. But the most dramatic improvement is the speed of the graphics. I have now used Ami Pro extensively, and most of my files include PCX graphics captured with Frieze. With the new version of Ami, a graphic can be moved in the frame much more quickly, and they can be scaled by dragging a corner handle of the frame while holding the Shift key. There are additional icons for the icon bar, a document 'description' can be appended when saving the file, frames can be anchored beside text, and the spell checker can search text in the main text stream as well as that in frames, tables and headers. Moving blocks of text is now much easier, as sentences or paragraphs can be selected then moved to the new cursor position without going through the clipboard.

In short, Ami Pro is a fabulous application for Windows 3.0, and is my reason for having Windows in the first place. The review copy was provided by Software Suppliers, (02) 888 1955, and the recommended price of Ami Pro 1.2 is \$699; the upgrade from 1.1 is \$50, which includes a small manual detailing the changes in the Ami Pro program. Software Suppliers also have a special offer for those upgrading their previous run-time version of Windows and Ami Pro 1.1: for \$150 you receive a full version of Windows 3.0 and the upgraded version of Ami.

– Peter Philips

Terminal emulator

GreyTerm

GreyMatter Computing
Phone: (02) 327 8855
Fax: (02) 327 8756
Price: \$75 per PC

GreyTerm is a configurable TSR (terminate and stay resident) terminal emulator for PCs. Emulations are supplied for QNX, Xenix, Unix, Pick, ansi and VT-100 systems, and others can be added using a utility supplied.

Using serial and/or modem connections, users can either have one terminal connected to two hosts or two terminals connected to one host; hot-keys are used to toggle between remote and local terminals. System parameters can be set dynamically using a system of pop-up menus, which also facilitates file transfers (using Kermit) and background printing. GreyTerm can be used for color and mono terminal emulation and will support 43-line screens in EGA and VGA.

```
Greyterm tcap editor

...Add a tcap entry
...Edit a tcap entry
...Delete a tcap entry
ESC...Exit GTCAP

Enter your choice :
```

Custom keyboards

Unique Micro Designs

261 series Custom Keyboard
Phone: (03) 887 1022
Fax: (03) 887 0734
Price: \$848

The 261 series keyboards are designed for use in applications which require non-standard keyboard layouts or 'macro' key inputs – all keys are fully programmable. The keys are laid out in a 5 by 11 matrix in either with key-caps or a membrane. The key-caps are removable and can have either user-defined or standard symbols. The keyboards can function with a standard keyboard or can be used standalone.

Entry level CAD

CadKey Light v1.5

Advanced Manufacturing Technologies
Phone: (02) 683 4033
Fax: (02) 683 4918
Price: \$695

EMS software

Turbo EMS 5.0

Commenge & Associates
Phone: (03) 614 3581
Fax: (03) 614 6714
Price: \$199

Turbo EMS can simulate up to 32Mb of expanded memory on

both '386 and non-'386 systems. The package also has the ability to re-locate TSR programs, device drivers and network shells for more efficient memory management. For users with LIM 3.2 boards, the package can simulate LIM 4.0. Turbo EMS is said to be completely compatible with MS Windows and provides special support for DesqView, Excel and Ventura, as well as offering '386 support for Lotus 1-2-3 v3.0. Additional features include network compatibility, Vdisk detection, page-frame alignment, high-memory analysis and true page aliasing.

Training

WordPerfect Video Learning System

Micro Management Services
Phone: (02) 452 5966
Fax: (02) 452 5098
Price: \$459 per set
\$825 two-volume set

From Anderson Soft-teach, this new video-based training package for WordPerfect 5.1 covers creating and revising documents, formatting and printing, using the pull-down menus, working with tables and using maths, merging documents, importing and formatting graphics and automating with macros. There is also an 'extra section for experts' for advanced users. It's claimed that by using the system, users can be brought up to speed within 2 or 3 hours. Course material includes two video tapes, two personal training guides and practice disks. Micro Manage-

ment Services also has a selection of other training aids for various versions of WordPerfect and a video covering the new features of version 5.1.

Integrated software

PFS:Easy Start

Software Publishing Corp
Phone: (02) 418 7188
Price: \$89

The latest addition to the well-known PFS line is Easy Start, an integrated package combining wordprocessing, a spreadsheet, filing system and telecommunications. A spell checker is included with the full-featured wordprocessor. Users can create new spreadsheets and use the built-in templates from tracking expenses. The filer has built-in forms for addresses, bank transactions and household possessions and the ability to create custom forms.

Software for Windows

Soft Kicker Plus

Logo Distribution
Phone: (02) 819 6811
Fax: (02) 819 6930
Price: \$249

Superseding Soft Kicker 2.0, this new release supports Windows and color GEM applications. There is now a panning facility that stores a 1024 x 1024 page in memory, allowing access to any part of the page without using



New products?

WE ARE ALWAYS seeking new and interesting products to tell our readers about – we are particularly interested in products that would be useful to small businesses, professional offices and 'standalone' users. Please address release information to: **New Products, Your Computer, PO Box 227, Waterloo 2017 NSW**. Preference will be given to those accompanied by suitable illustrations. For inclusion in a specific month, material must be submitted 6 weeks prior to the cover date. We are also interested in the stories behind any new Australian product development – if there is a tale to your product that you would like to tell our readers, please contact Mark Cheeseman, Features Editor, on (02) 693 4143.

the scroll bars. A new Home feature sends the cursor to the menu bar when the right mouse button is clicked; the Home command also includes an Enlarge feature for detailed editing. Soft Kicker Plus is compatible with EGA and VGA boards only (it is not compatible with the Genoa Super EGA board).

Show Partner F/X v3.6

Show Partner F/X v3.6
Phone: (02) 954 0248
Fax: (02) 925 0311
Price: \$550

In this new version, Show Partner F/X incorporates the music editor (Piano F/X) with a custom version of Pianoman and includes an extensive library of tunes and sound effects. There is also a new screen capture routine that supports Windows 3.0 in both real and protected modes. The mouse driver's cursor can now be utilised by a mouse menu with smoother, more responsive mouse action and less memory usage. With a VGA system, users now have access to the full 256,000-color palette in all text and graphics modes. There is a new utility that supports conversions to and from GX2 and PCX formats. Other enhancements include faster EMS memory utilisation, a high speed clock manager and full support for Hercules presentations.

Active Life

Solutions
Phone: (075) 39 5422
Fax: (075) 39 3482
Price: \$245

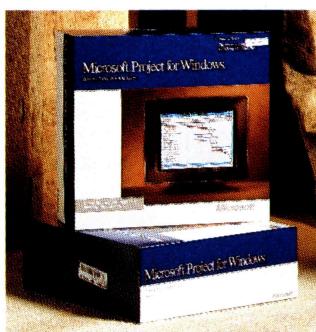
Active Life is a personal information manager that integrates task

scheduling and an appointment calendar – all tasks and appointments have a duration and flow into a daily schedule. The software has built-in alarms and offers weekly summaries, pop-up calendars and historic archiving. A companion database, Notebook, features indexing on text and graphics with auto-sorting, title/text searching, auto-dial and a wordprocessor.

Project

Microsoft
Phone: (02) 452 0288
Fax: (02) 452 4387
Price: \$1105
\$330 upgrades
\$880 License Pack

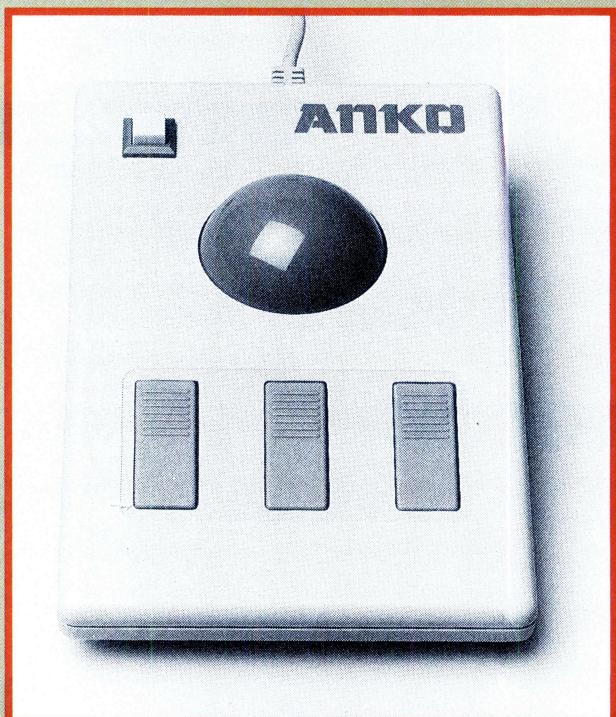
Under Project of Windows, tasks can be either resource- or duration-driven. Resources can be assigned on a partial basis and can be selectively leveled to balance resources across multiple projects. Resource calendars can be defined at multiple levels for an entire project, for a group of resources or for an individual resource. For individual resources, calendars can calculate specifics



Trackballs

I am a long time user of a mouse, even going to the lengths of writing my own mouse driver for use with Framework III. My favorite is the cordless BMC Mouse (which I reviewed in this magazine several months ago). The BMC mouse also has a button on the side which allows very fine cursor control, which is particularly nice for use with Windows 3.0. When Jake said he was using a cordless trackball with 30 per cent greater resolution than I was currently getting from my BMC Mouse, I decided to have a look at two trackballs. The first was the Anko Trackball (\$135 distributed in Australia by Microgram Computers, (043) 32 8651, and other was the BMC Trackball (\$149), distributed by Computer Magic, (07) 812 1611.

The Anko Trackball is capable of emulating the movements of both the Microsoft Mouse and the Logitech Mouse. There is a reasonably comprehensive instruction manual and a vinyl 'garage' with the trackball. A nice feature was the provision of both 9 and 25 pin D-connectors to allow its use with either the standard serial port or the AT serial port. Unfortunately, the location of the three buttons is such that only a double-jointed chimpanzee could operate both them and the ball at the same time. There is a special 'drag' button, which is used to lock the trackball into a special mode of select, drag and release. However, to operate this mode requires the user to remove his fingers from the ball and then perform a Digital Dance to operate it. Whatever other users may have found, I just couldn't come to terms with its operation. A special user menu to control the operating characteristics of the Trackball is provided, but there is no provision to reverse the direction of operation of the ball, so that the buttons could be located in front of the ball. I tried using the trackball with several different programs (WordStar, Windows, Word & Excel) and it worked quite well. It was only when I was using Windows, that the combination of rolling the ball and trying to push the left-hand button with my thumb produced a major disaster - I deleted every file on



Drive D (yes, I do keep backups and yes, I do have PCTools v6.0). I know that I should have been using the drag button, but it's located so far from the ball (see photo) that I figured I'd try the 'chimpanzee method'. After I successfully undeleted all the files, I permanently removed the Anko Trackball from my system and into its box.

The BMC Trackball is the one that I was originally told about by Jake, and, since there were only five in the country then, Warren Stone (of Computer Magic) twisted some arms and managed to get hold of one for me to look at. I immediately liked its appearance, because the buttons are arranged around the trackball. There is also a circular button used for 'power-up and fine control', a trademark of the BMC Mouses. If the trackball isn't used for about 10 minutes, it automatically powers down and the user must push this button to re-activate it - this very usefully extends the battery life (the BMC unit takes four AA batteries). The 'fine control' feature allows the user to hold down this button and then move the cursor in very small increments, or quite large leaps. This Trackball also has a drag option which is activated by pushing either the left- or right-hand buttons in conjunction with the centre button - it is not necessary to remove one's hands from the ball to operate this feature.

One very nice feature of Trackballs in general is the fact that they don't have to be rolled across a desk, collecting dust and garbage in their innards.

- Roy Hill



such as shift scheduling and vacation times. Support for the graphical interface means that tasks can be manipulated or rescheduled by moving icons, rather than re-entering data.

Excel, dBase and Lotus 1-2-3 data formats are supported.

Windows Software Development Kit
Microsoft

Phone: (02) 452 0288

Fax: (02) 452 4387

Price: \$805

Now supporting Windows 3.0, the Software Development Kit can be used to directly address

up to 16Mb of RAM on machines with an 80286 processor and virtual memory on '386-based systems. Included in the Kit are a CodeView debugger for Windows, resource editing tools, op-

timisation tools, new source code examples and documentation in both hard copy and online formats. Swap Tuner, one of the new optimisation tools, reduces calls across code segments by analysing the calls, swaps and discards and procedure returns that occur during program execution; a second tool, Profiler, calculates the amount of time the Windows interface spends executing specific sections of code. Other tools verify the receipt of messages sent to a specific application window, examine the value of message parameters and program's memory allocation, and demonstrate the effects of memory movement. In addition to the Software Development Kit, Microsoft has released a new device driver kit.

Keyboard templates



Pacific Rim Products

FuncKey templates
Phone: (02) 953 8504
Fax: (02) 953 9523
Price: \$5.75 10-key template
\$7.75 12-key

The FuncKey range of Function key templates feature standard color-coding to simplify switching between programs and templates. The templates use a larger typeface than similar products and the background ink has been specifically chosen to reduce glare. All templates are available for 10-key (XT) or 12-key (AT) keyboards. The range covers over 30 popular packages including PageMaker, Ventura, WordStar, Multimate, dBase, Lotus 1-2-3, Quattro and Paradox.

Optical filing

Friday (Canofile 250)

Canon

Phone: (02) 887 0166
Price: \$25,000 Canofile 250 with Fileprint 100

The Canofile 250 incorporates an image scanner, display, keyboard and Magneto-Optical Disk Drive. The scanner can handle 40 A4 pages per minute at 200dpi, or scan both sides simultaneously at 100dpi; images are compressed using G4 techniques before recording on the optical disk. The Canon Magneto-Opti-



cal Drive units can re-write data to the optical disk, meaning each disk can be used many times. The double-sided disks hold 256Mb per side (equivalent to about 12,000 A4 pages). Function keys below the display facilitate searches, indexing and retrieval. An 8ppm Laser Beam printer, the Fileprint 100, is included.

Inspire optical storage system

DIOS

Phone: (02) 953 0211
Fax: (02) 953 9885
Price: depends on configuration
DIOS are now distributing the Alphatronics range of Inspire rewritable optical storage systems. Interfaces are available for the Macintosh range (including the portable), Dos and MCA machines, Novell NetWare, Sun systems running SunOS 4.0 and greater and various DEC sys-

31MHz XT upgrade

Electronic Solutions
Phone: (02) 906 6666
Fax: (02) 906 5222
Price: \$225

Local board supplier Electronic Solutions is offering an 80286 motherboard, the MBXC2, as an upgrade for 4.77MHz PC/XTs. The 12MHz, 0 wait state board gives a Norton SI of 6.5 (which gives a nominal speed rating of 31MHz compared to a standard XT). By using the standard XT bus on the board, compatibility with the original disk controller, power supply, EMS memory cards are maintained; many XT floppy disk controllers and, video and other peripheral cards will also work with the system. The MBXC2 has 640K RAM standard (the board will take 1Mb) and speed is switchable between 4.77MHz and Turbo.

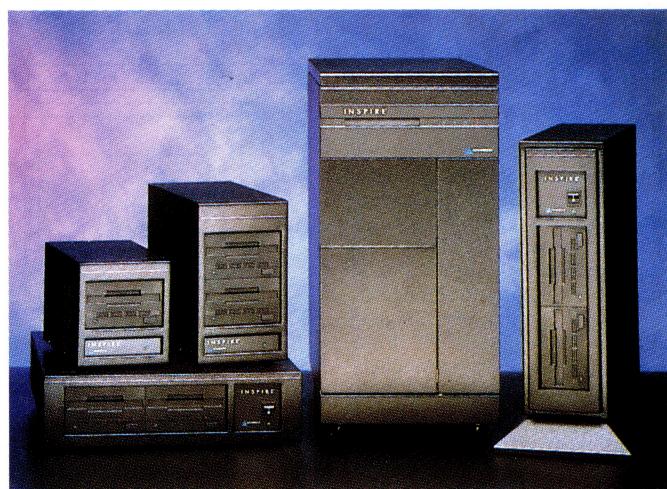
and up to 7 drives can be daisy-chained together. For those with extensive data storage requirements, 25- and 55-cartridge jukeboxes are available with dual disk drives. The systems have a 12-month warranty.

Investment charting

Dowchart

Dowchart
Phone: (06) 292 4718
Price: \$295
\$15 demonstration disk (refundable on purchase)

Dowchart is an Australian written package that enables small to medium size investors to monitor the price movement of stocks, commodities, indices, currencies and interest rates on an IBM-compatible computer. Charts are grouped under headings for Indices, Mining, Industrial and Commodities. Charts can be expanded, compressed and over-



Turbo C++

Borland Pacific

Phone: (02) 418 7330

Fax: (02) 418 7307

Price: \$280 Turbo C++

\$410 Professional Pack (includes Turbo Debugger and Tools)

Borland has announced Turbo C++ Professional, a new software tool designed to help C programmers build reusable software modules, enabling corporations and independent developers to build more complex software in less time. The compiler combines object-oriented programming, which the company touts as the most advanced software development technology for the '90s, with the C programming language, which is in use by more than two million developers. David Downing, Borland spokesman, told Newsbytes that C programmers have been slow to embrace OOP (object-oriented programming) basically due to the fact that old habits die hard, but that this version eases passage into this new programming method by letting programmers mix traditional and object-oriented techniques. With C++, programmers can use OOP features in a familiar language. Philippe Kahn, Borland chairman, believes strongly that object-oriented programming is the more powerful and easier way software will get created in major corporations. He adds, 'Major benefits to corporations now suffering from a backlog of needed software applications will include lower maintenance costs and higher programmer productivity.'

laid, or seen in a split screen. The package allows charts to be rescaled for bonus issues, rights, splits, calls, consolidations and capital redistributions. Details such as the franking status, price to earning (P/E) ratio, dividend and dividend yield are also displayed. A range of charts is supplied with the package and a number of others (with 6 months or more date) are available for \$10 each.

HyperCard 2.0

Apple Computer

Phone: (02) 452 8000

Fax: (02) 452 8160

Price: \$87

HyperCard 2.0 incorporates over 100 new features which take advantage of the memory capacity, large screens and processing power of modular Macintosh systems; HyperTalk has been enhanced and there is now a suite of debugging tools included. Stacks can now be created with variable card sizes, from less than 1 to 18 square inches. Other new features include multiple windows to view several stacks simultaneously for faster cutting and pasting; new Font and Style menus; and a new

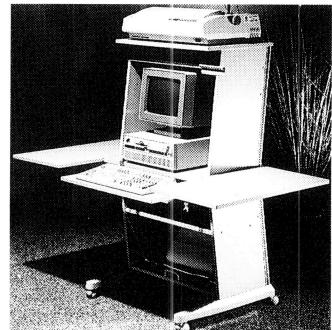
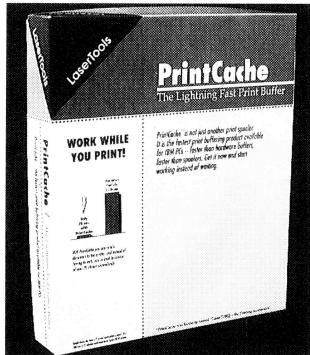
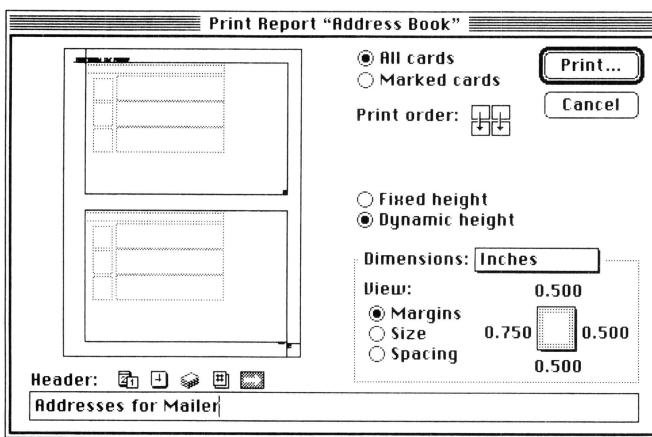
Report Layout Editor. HyperTalk now includes an automatic runtime compiler and scripts will run in the background under Multifinder. The XCMD interface has been extended to automatically send window events to the appropriate window and new routines have been added for creating customised script editors.

Print Spooler

PrintCache

Logo Distribution

Phone: (02) 819 6811



Fax: (02) 819 6930

Price: \$249

PrintCache is a high speed print spooler and accelerator with 'unlimited' buffering capacity. Using an interrupt driven design, data is sent to the printer more quickly than with the background printing facilities of many other spoolers. The unit can be configured to support and spool to any number of printers. Optimised print routines are used to speed parallel printing and serial printing is also improved, giving speeds of up to 115K. Graphics optimisation is used to increase throughput with the HP LaserJet (by 150 to 400 per cent); similar improvements are claimed for the HP PaintJet from applications which don't use the data compression modes.

Computer furniture

Sylex

Parallax range

Phone: (02) 647 2888

Fax: (02) 748 0701

Price: depends on configuration

Sylex are now shipping the new

Education packs from Lotus

Tech Pacific

Phone: (02) 697 7111

Price: \$255 1-2-3 v2.01 and v2.2

\$295 v3

\$342 Symphony 2.2

\$255 Freelance Plus v2.01

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THE PROPHET



LARRY
LEWIS

The Small Business Accountant

NOT MUCH IS happening on the BBS front at the moment, so I thought it was about time a truly Australian product had a review that didn't revolve around all those technical comparisons, but instead concentrated on what the package was supposed to do. If you have a business and a computer and you are looking for a nice, easy to use accounting package, maybe this one is just what the doctor ordered.

Long ago, I used to write accounting software, both professionally (for my employer) and for fun (using Basic and Cobol on my trusty old TRS-80s). Back then, small businesses had very few options about computerising their bookkeeping. In order to issue 'computer' invoices, there were specialised packages which were quite costly.

As computers have become more powerful, software has become bigger, and in most cases, more complicated. With bookkeeping/accounting softwares, I have noticed that most packages are more interested in the accountant's view of the business rather than the person running it – they expect you to do too much bookkeeping when you should be out making a quid.

Complete BBS Registry Listing

WE PUBLISH THE COMPLETE listing for the ACT and New South Wales in July, October, January and April; the listing for Victoria, Tasmania and the Northern Territory in August, November, February and May; and South Australia, Western Australia and Queensland in September, December, June and March.

Registration of Bulletin Boards are only accepted electronically, at the primary electronic collection points – please address all enquiries through them.

The Small Business Accountant

WHILE MOST OF the big accounting packages have automatic installation and initialisation, once that is complete, you are left holding the 'baby' so far as trying to do anything more with the system. Also, each part is generally an optional extra. The only two things that are not in the standard Small Business Accountant (SBA) package are multi-user and Multi-Company processing.

Installing SBA is very simple – insert a disk into your floppy and type 'install'. A menu will pop-up which will allow you do a first time install or various upgrade functions (that is, you already have SBA and this is a new release of the software).

As part of the installation process, a set of 'dummy' books ('sample data files' as SBA calls them) will be created to allow you to test the program. When you have finished the installation process, you can go to the sample data files and try things like issuing invoices, adding accounts, changing details and so on. In other words, you can play without the worry of having to clear the system and then re-installing the program again. The manual also contains a few sample exercises.

Now that you have SBA on your system and made use of the sample data files, the process of building your business records begins. At this point, most other accounting packages go into technical jargon, however, SBA sticks to English.

The program leads you through the various options that you can use such as debtors, creditors, the fixed assets register, stock control and general ledger. And, it allows you to use a password which is a good idea to prevent other people gaining access to your files. Even though SBA is a great package, you *do* have to type in your information or data – or as No. 5 (from the movie *Short Circuit*) would say: 'Input, I need more input!'

Back-ups

ANOTHER PLACE where SBA shines is in the back-up area – every package tells you at least 50 times that you should do back-ups (in the manual). A few even put a message like 'please ensure adequate back-ups are performed' whenever you exit.

When you exit, SBA defaults to wanting to back-up your system automatically. All you do is press enter, and after a few seconds it's done. This is not a perfect back-up as the copy is stored on the same hard disk as the main information, but it means that if you have a minor problem, SBA can just resurrect your accounting records on the spot.

It also has an option on the same menu (which you are encouraged to use) to create back-up copies to a floppy disk. Although this process is slower, it does mean that you have a complete set of your accounts that can be stored away from the computer. Before doing an end of month processing, you will also get a gentle reminder that you should do a back-up first (just in case).

Keeping a copy, on a floppy disk, somewhere secure is a must for a business. The computer is (hopefully) insured, and if it is stolen or you have a fire, the computer should be easily replaced – your accounting records (and other important information) can be totally irreplaceable, and that off-site disk can save your business!

If you think SBA is pretty easy to get along with – you're right! The day to day processing, issuing invoices, recording payments and the general 'humdrum' associated with processing your books is made as simple and straight forward as possible. In fact, it is almost pleasurable (if that is possible) to perform the normal daily entries to your books.

Features

A FEATURE THAT may be of more interest to some business people is regular invoicing. If you have clients that you bill monthly, bi-monthly or quarterly, this facility will allow you to create the invoices automatically when they're due. Another nice option is a sales log. If you are in an industry where your clients do a large number of small transactions, you might not want to invoice every separate purchase, but instead, send just one bill at a particular time (for example, at the end of each month).

Multi-user facilities that you can use with the package are not free, but at \$150 it's still excellent value. Multi-user allows more than one person to be processing invoices, payments and so forth, at the same time using a local area network (LAN). Installation

NATIONAL BBS LISTING

tion of multi-user facilities should be left to the experts, not because it's too hard, but the ability to totally ruin your accounting records by setting it up wrong is a distinct possibility.

Multi-Company costs an additional \$50 and is handy if you trade with a number of businesses that are in turn owned by an 'umbrella' business. Multi-Company will allow you to run all the subsidiaries as separate entities and transfer the necessary entries to the holding (primary) business.

Hotline support is available in all capital cities, and it is unusual to say the least. The hotline support is from accountancy firms – in other words, the people helping you understand book-keeping and are not computer boffins – they understand accounting practices and SBA. The author of the system is also available if it turns out to be a technical problem.

Upgrades are available and purchasers have the option of using a modem to download the latest version direct from the author's bulletin board system – free of charge. On-site training is available (presumably within the capital cities) and there's a simple menu program just in case you are still struggling with the Dos prompt to run your software.

Summary

SBA IS A neat and tidy accounting package that is able to cope with most business operations. It is totally Australian and the author has followed the 'keep it simple' approach throughout. The documentation is excellent, and the information on 'how to' is by way of examples rather than the usual cryptic explanations.

It costs \$795 rrp, and is available from various software dealers (and accounting firms) – call Formula One Software on (02) 872 6681 for the nearest dealer. The add-ons for SBA are hotline support – \$200 per year; upgrade service – \$200 per year; on-site tuitions – \$200 per session; Multi-Company option – \$50 once only; multi-user option – \$150 once only. A 'fully functional' demonstration of the latest version is available from Prophet BBS on (02) 628 5688, although you will need to register for access prior to being able to take the files (and they are *big*). Dealers also have demonstration copies available for prospective clients.

Primary electronic collection points

ACT – PC Exchange Opus (062) 581 406

NSW – 2000 & Beyond Alive BBS (02) 544 7123

Vic. – Custom Programming BBS (03) 848 3331

Qld. – The Galaxy GateWay Computer System (07) 207 8900

SA – Oracle PC-Network (08) 260 6222

WA – 1990 Multiline (09) 370 3333

Tas. – Hobart Users Bulletin Board (002) 435 041

BBS Listing 9007

Sun 1 Jul 1990

New systems: 21
Online: 6
Unknown: 3
Temporarily Offline: 2
Permanently Offline: 4
Name Change: 6
Amended: 35
Total Systems: 463

QUEENSLAND

Access Australia BBS
Sysop: William Brackenridge
Phone: (07) 284-6990
FIDOnet: 3:640/207
Baud: V21 V22 V22bis V23
Access: Public

Access North Queensland
Phone: (07) 51-0566
Baud: V21 V22 V23
Access: Reg LVA
Computer: IBM XT Clone
DOS: MS DOS

BBSSoftware: CMVideoTeX

AMPAK NorthGate/PRBBS

Sysop: Brian Wendt
Phone: (07) 263-7070
FIDOnet: 3:640/205
Baud: V21 V22 V22bis V23 V32 PEP
Access: Public
Computer: PROFOUND 386/25
DOS: MS DOS
BBSSoftware: Opus

Apple-Q Inc. BBS

Sysop: Vince Crosdale/Graham Black
Phone: (07) 851-1711
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: Apple IIe
DOS: ProDOS
BBSSoftware: GBBS Pro

CHILDS PLAY BBS

Sysop: Mick McCormick
Phone: (07) 354-3020
SIGnet: 28:1100/169
Baud: V21 V22 V22bis
Access: VA
Hours: Daily: 2000 - 0500
Computer: IBM XT Clone
DOS: MS DOS
BBSSoftware: RemoteAccess

Christian Resource - BBS

Sysop: Kerry Robinson
Phone: (07) 257-1466
FIDOnet: 3:640/101
Baud: V21 V22 V22bis V23
Access: Mem LVA
Computer: Galaxy AT
DOS: MS DOS
BBSSoftware: Opus

Commodore Computer Users Group Qld

Sysop: Graeme Darroch
Phone: (07) 808-7694
FIDOnet: 3:640/304
Baud: V21 V22 V22bis V23 V32
Access: Mem Reg VA
Computer: IBM XT
DOS: MS DOS
BBSSoftware: Opus

COMTEL BBS

Sysop: Warren Mason
Phone: (077) 41-1822
FIDOnet: 3:640/740
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem LVA
Computer: FUJITECH XT
DOS: MS DOS
BBSSoftware: Maximus

Contention BBS

Sysop: Gregory Bradley
Phone: (077) 73-7524
FIDOnet: 3:640/720
Baud: V21 V22 V22bis V23
Access: Reg
Hours: Daily: 2300 - 0600
Computer: IBM Clone
DOS: MS DOS
BBSSoftware: Maximus

Dove System

Sysop: Daniel Churchman

Phone: (07) 261-2481
FIDOnet: 3:640/777

Baud: V21 V22 V22bis V23 B103 B212

Access: Reg LVA

Computer: IBM Clone

DOS: MS DOS

BBSSoftware: QuickBBS

ECLECTIC EMPIRE

Sysop: Tony Smith
Phone: (077) 74-1190
FIDOnet: 3:640/701
Baud: V22 V22bis V32
Access: Reg LVA
Hours: 2030 - 0830 daily
Computer: IBM XT
DOS: PC DOS
BBSSoftware: Maxirnus

EDUCATIONAL BBS

Sysop: Andrew Waddell
Phone: (07) 266-3369
Baud: V21 V22 V22bis V23 V32
Access: Mem VA
Computer: IBM 386 Clone
DOS: MS DOS
BBSSoftware: Mailbox

Electric Dreams BBS

Sysop: Joe Altoff
Phone: (07) 399-1322
Baud: V21 V22 V22bis V23
Access: Mem VA
Computer: Apple

ESE ESCAPE BBS

Sysop: Mark Garlipp
Phone: (07) 371-4403
FIDOnet: 3:640/371
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM 386sx Clone
DOS: MS DOS
BBSSoftware: OPUS

FAR-NOR-64 BBS

Sysop: Ian Pearce
Phone: (070) 54-6892
Baud: V21 V22 V23 B103 B212
Access: Mem Reg LVA
Computer: C-64
DOS: BASIC IEEE
BBSSoftware: BBS64

Genius BBS

Sysop: Jeremy Howell
Phone: (07) 870-2819
FIDOnet: 3:640/486
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSSoftware: QuickBBS

GOLD COAST Bulletin Board.

Sysop: Glenn Dawson
Phone: (075) 39-1732
FIDOnet: 3:640/935
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem LVA
Computer: Star 10 XT
DOS: MS DOS
BBSSoftware: QuickBBS

Grammar BBS

Sysop: Barry Taylor

NATIONAL BBS LISTING

Phone: (077) 72-6052 FIDOnet: 3.640/702 Baud: V21 V22 V22bis V23 V32 Access: Reg LVA Computer: IBM XT Clone DOS: MS DOS BBSSoftware: Opus	Phone: (079) 51-4815 Access: Public Hours: Weekdays: 1600 - 0730-Weekends: 24 Hours	Phone: (07) 800-4660 Baud: V21 V22 V22bis V23 Access: Mem	Phone: (07) 890-1453 FIDOnet: 3.640/390 Baud: V21 V22 V22bis V23 Access: Public Computer: IBM Clone DOS: MS DOS BBSSoftware: Maximus Note: Registration required for full access.
Greenhorn Experimental - Bris- BUG ?1 Sysop: Mike Richardson Phone: (07) 208-7663 FIDOnet: 3.640/301 Baud: V21 V22 V22bis V23 PEP Access: Mem LVA Computer: IBM 386 Clone DOS: MS DOS BBSSoftware: RemoteAccess	Marlin-Coast BBS Sysop: Ray Chalmers Phone: (070) 57-7658 FIDOnet: 3.640/501 Baud: V22 V22bis B103 PEP Access: Reg VA Computer: Pericom 386/20 DOS: MS DOS BBSSoftware: Opus	Radio Experimenters Group BBS Sysop: Chris Joyce Phone: (07) 273-7081 FIDOnet: 3.640/273 Baud: V21 V22 V22bis V32 B103 B212 Access: LVA Computer: Blue Chip 386 DOS: MS DOS BBSSoftware: Opus Note: MNP up to Level 4 is Supported	Sunshine Coast Connection Sysop: Brian Boseley Phone: (071) 44-2889 FIDOnet: 3.640/401 Baud: V21 V22 V22bis V23 Access: Public Hours: Mon - Sat: 2000 - 0800Sun: 24 Hours Computer: IBM AT Clone DOS: MS DOS BBSSoftware: Opus
Ground Zero BBS Sysop: Gary Renkin Phone: (07) 812-3474 FIDOnet: 3.640/812 Baud: V21 V22 V22bis V23 V32 Access: Public Computer: IBM XT Clone DOS: MS DOS BBSSoftware: RemoteAccess	Marwick's MadHouse Sysop: Paul Marwick Phone: (07) 371-5864 FIDOnet: 3.640/820 Baud: V22 V22bis V32 PEP Access: Mem VA Computer: Skai 386/20 DOS: MS DOS BBSSoftware: Maximus	Redcliffe Library Sysop: Andrew Osborne Phone: (07) 283-0315 FIDOnet: 3.640/203 Baud: V21 V22 V22bis V23 B103 B212 PEP Access: Reg VA Hours: Weekdays: 1700 - 0800-Weekends: 24 Hours Computer: Hyundai AT BBSSoftware: Opus	Swiss Connection Sysop: Andrew Osborne Phone: (07) 283-0314 FIDOnet: 3.640/204 Baud: V21 V22 V22bis V23 Access: Reg VA Computer: IBM AT BBSSoftware: Opus
Hi-Tech CBBS Sysop: Clyde Smith-Stubbs Phone: (07) 300-5235 Baud: V21 V22 V23	Michael's Scouting Sysop: Michael Phone: (076) 66-3655 Baud: V21 V22 V22bis V23 Access: Public Computer: IBM XT Clone DOS: PC DOS BBSSoftware: Opus	Rock Cave BBS Sysop: Rick Dalley Phone: (07) 395-1809 Baud: V21 V22 V22bis V23 Access: Mem VA Computer: IBM XT clone DOS: MS DOS BBSSoftware: Mailbox	The Centre Baud Sysop: RAM Phone: (07) 368-1239 FIDOnet: 3.640/378 Baud: V21 V22 V22bis B103 B212 Access: Reg LVA Computer: IBM AT Clone DOS: MS DOS BBSSoftware: Lynx
High Flyer BBS Sysop: David Klaerstyn Phone: (075) 57-1127 FIDOnet: 3.640/571 Baud: V21 V22 V22bis V23 Access: Public Computer: IBM XT Clone DOS: MS DOS BBSSoftware: QuickBBS	Modem Magic Sysop: John Wain Phone: (07) 264-4747 FIDOnet: 3.640/212 Baud: V21 V22 V22bis V23 Access: Reg VA Computer: IBM 386 Clone DOS: MS DOS BBSSoftware: Opus	Sidecar Express BBS Sysop: Brendan Pratt Phone: (075) 46-3252 FIDOnet: 3.640/463 Baud: V21 V22 V22bis V23 V32 Access: Mem LVA Computer: Amiga 2000 DOS: AmigaDOS BBSSoftware: Paragon	The Flying Scotsman Sysop: Graeme Willox Phone: (07) 297-5265 FIDOnet: 3.640/297 Baud: V21 V22 V22bis V23 Access: Reg LVA Computer: IBM AT Clone DOS: MS DOS BBSSoftware: Lynx
Hitch-Hikers Guide to The Gal- axy BBS Phone: (07) 369-9726 Baud: V21 V22 Hours: Daily: 2200 - 0730 BBSSoftware: RemoteAccess	Nightlife QuickBBS Sysop: Jonathan and Gillian Levine Phone: (07) 849-5927 FIDOnet: 3.640/349 Baud: V21 V22 V22bis V23 Access: Public Computer: IBM XT Clone DOS: MS DOS BBSSoftware: QuickBBS	SIMCOM BBS Sysop: Patrick Simonis JP Phone: (07) 341-7407 FIDOnet: 3.640/841 Baud: V21 V22 V22bis V23 Access: Mem Reg LVA Computer: IBM AT Clone DOS: MS DOS BBSSoftware: Opus	The Lian's Den Sysop: Yvette Lian Phone: (07) 300-1152 FIDOnet: 3.640/352 Baud: V22 V22bis V23 Access: Public Computer: President 286 DOS: MS DOS BBSSoftware: QuickBBS
House of Hawk Sysop: Hawk Phone: (075) 91-6357 Baud: V21 V22 Access: Reg LVA Hours: Weekdays: 2000 - 0600-Weekends: 2000 - 0800 Computer: Apple DOS: ProDOS BBSSoftware: GBBS	NQ Connection Sysop: Geoff Gordon Phone: (077) 79-7660 FIDOnet: 3.640/710 Baud: V22 V22bis PEP Access: Reg VA Computer: Kaypro XT DOS: MS DOS BBSSoftware: Opus	STParadise Sysop: Steve Lawrence Phone: (07) 847-1003 FIDOnet: 3.640/847 Baud: V21 V22 V22bis V23 V32 Access: Reg VA DOS: MS DOS	THE LIGHTHOUSE BBS Sysop: Jason Trump Phone: (071) 91-1167 GTnet: 307/001 Baud: V21 V22 V22bis V23 V32 Access: Mem Reg VA Computer: CCS XT DOS: MS DOS BBSSoftware: GTPower
Listline Experimental Phone: (07) 353-3718 Baud: V21 V23	OZ Board Sysop: Tim Spray Phone: (077) 21-3592 FIDOnet: 3.640/715 Baud: V22 V22bis PEP Access: Reg LVA Hours: Daily: 1800 - 0600 Computer: IBM AT Clone DOS: MS DOS BBSSoftware: Opus	Sugar City BBS Sysop: John McQuire Phone: (079) 52-3928 Baud: V21 V22 V22bis Access: Public Computer: INI-X-10 DOS: MS DOS BBSSoftware: RBBS PC	The Messenger QuickBBS Sysop: Allan Richards Phone: (07) 282-6022 Baud: V21 V22 V22bis V23 Access: Public Computer: DMC 386sx
Little Greece BBS Sysop: The Little-Wog Phone: (07) 345-8520 FIDOnet: 3.640/344 Baud: V21 V22 V22bis V23 Access: Public Computer: ACS Technology 386 DOS: MS DOS BBSSoftware: QuickBBS	Phoenix BBS Sysop: Kelvin Saggers	Sun Central BBS Sysop: David Sonter	
Mackay High School BBS Sysop: Bob Chalmers			

NATIONAL BBS LISTING

DOS: PC DOS
BBSSoftware: QuickBBS

The Missing Lynx CIBS

Sysop: Mike Barber
Phone: (07) 808-3094
FIDOnet: 3:640/808
Baud: V21 V22 V22bis B212 PEP
Access: Public
Computer: 2 x XT's on LAN
DOS: MMS DOS
BBSSoftware: Lynx

The Sower BBS

Sysop: Peter Maurici
Phone: (071) 41-6734
FIDOnet: 3:640/416
Baud: V21 V22 V22bis V23
Access: Reg LVA
Computer: IBM AT Clone
DOS: MS DOS
BBSSoftware: RemoteAccess

Toowoomba RBBS

Sysop: Chris White
Phone: (076) 30-1762
Baud: V21
Access: Mem Reg LVA
Hours: Daily: 2100 to 0630
Computer: C-128

Townsville Apple Bulletin Board

Sysop: Christopher Griggs
Phone: (077) 73-3651
Baud: V21 V22 V23 B103 B212
Access: Mem Reg LVA
Computer: Apple //e
DOS: ProDOS
BBSSoftware: GBBS

Transcendental Connection

Sysop: Kenneth Page
Phone: (07) 281-9418
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: Amiga 1000
DOS: AmigaDOS
BBSSoftware: Atredes

XENTEK

Sysop: Ken Speakman
Phone: (07) 807-4808
Baud: V22 V22bis
Access: Public
Computer: Intel 386
DOS: SCO XENIX
BBSSoftware: XBBS

WESTERN AUSTRALIA

1990 MultiLine

Sysop: Graeme and Gloria Platt
Phone: (09) 370-3333
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem LVA
Computer: IBM 386 Clone
DOS: MS DOS
BBSSoftware: TBBS

Chip Board

Sysop: Bradley Gawronski
Phone: (09) 572-1779

Baud: V21 V22 V22bis V23
Access: Public
Computer: Epson PC AX2
DOS: MS DOS
BBSSoftware: RemoteAccess

CITADEL BBS

Sysop: Adam Blake
Phone: (09) 367-8856
FIDOnet: 3:690/632
Baud: V21 V22 V22bis V23 V32
Access: Public
Computer: IPEX 386/25
DOS: PC MOS
BBSSoftware: RemoteAccess

COMPULink

Sysop: Andrew Waite
Phone: (09) 451-7288
FIDOnet: 3:690/628
Baud: V21 V22 V22bis V23
Access: Reg VA
Computer: IBM 386 Clone
DOS: MS DOS
BBSSoftware: Opus

Gamma Istar

Sysop: Richard Dale
Phone: (09) 493-1534
FIDOnet: 3:690/626
Baud: V21 V22 V22bis V23 B103 B212
Access: Mem LVA

GOLDFIELDS Opus

Sysop: Graham Clark
Phone: (090) 21-7755
FIDOnet: 3:690/643
Baud: V21 V22 V22bis V23
Access: Public
Computer: IBM XT Clone
DOS: MS DOS
BBSSoftware: Opus

Highflyer!

Sysop: Stuart Udall
Phone: (09) 448-0880
FIDOnet: 3:690/633

Baud: V21 V22 V22bis V23 B103 B212
Access: Mem LVA

Computer: IBM XT Clone

DOS: MS DOS

BBSSoftware: RemoteAccess

Lightning BBS

Sysop: Simon Blears
Phone: (09) 275-8225
FIDOnet: 3:690/601
Baud: V22 V22bis PEP
Access: LVA
Computer: Compaq 386s
DOS: Compaq DOS
BBSSoftware: Opus
Note: V21 B103 is NOT supported

Mini Omen

Sysop: Greg Watkins
Phone: (09) 279-8555
Baud: V21 V22 V23
Access: Public
Computer: TRS-80
DOS: NewDos

BBSSoftware: Omen

Murdoch University ES-BBS1

Sysop: Roger Atkinson
Phone: (09) 332-2604
Baud: V21 V22 V22bis V23
Access: Mem VA
Computer: Commodore 128D
DOS: CP/M
BBSSoftware: Turbo BBS

Paragon Computers BBS

Sysop: Paul Reeves Steve Quartely
Chris Parker
Phone: (09) 325-5160
Baud: V21 V22 V22bis V23

Access: Public

Computer: Atari ST

DOS: Gem

BBSSoftware: Michtron

Pegasus Entertainment System

Sysop: Michael Russell
Phone: (09) 345-2902
FIDOnet: 3:690/621

Baud: V21 V22 V22bis V23

Access: Public

Computer: Epson PC

DOS: MS DOS

BBSSoftware: RBBS PC

Perth Omen

Sysop: Mark Dignam and Mick Howland
Phone: (09) 244-2111
FIDOnet: 3:690/636

Baud: V21 V22 V22bis V23 V23ORG

Access: Mem VA

Computer: IBM XT Clone

DOS: MS DOS

BBSSoftware: Opus

Power Supply

Sysop: Jason Hay & Jason Wood
Phone: (09) 354-1412
Baud: V21 V22 V22bis V23 B103 B212

Access: Mem Reg VA

Hours: Weekdays: 1630 - 0830
Weekends: 24 Hours

Computer: Nimrod XT Turbo

DOS: MS DOS

BBSSoftware: QuickBBS

RemoteAccess HQ

Sysop: Andrew Milner
Phone: (09) 389-8048
FIDOnet: 3:690/625

Baud: V21 V22 V22bis V23

Access: Reg VA

Computer: IBM AT Clone

DOS: MS DOS

BBSSoftware: RemoteAccess

The Bombay Duck

Sysop: Steve Hodges
Phone: (091) 44-2253
FIDOnet: 3:690/641

Baud: V21 V22 V22bis V23 B103 B212

Access: Mem Reg LVA

Computer: Comsys XT

DOS: MS DOS

BBSSoftware: Opus

The Codiac Republic BBS

Sysop: Simon Shaw

Phone: (09) 227-5823
FIDOnet: 3:690/623

Baud: V21 V22 V22bis V23 PEP

Access: Reg

Hours: Daily: 2200 - 1000

Computer: Ultra 286 Plus

DOS: Compaq DOS

BBSSoftware: Opus

The Gathering BBS

Sysop: Ken Peters

Phone: (09) 272-4711

FIDOnet: 3:690/650

Baud: V21 V22 V22bis V23

Access: Reg VA

Computer: IBM AT Clone

DOS: MS DOS

BBSSoftware: RemoteAccess

The Library BBS

Sysop: Colin Wheat

Phone: (09) 293-2857

FIDOnet: 3:690/613

Baud: V21 V22 V22bis V23

Access: Public

Computer: IBM AT

DOS: MS DOS

BBSSoftware: Opus

The Sentinel BBS

Sysop: Andrew MacBeth

Phone: (09) 295-3275

Baud: V21 V22 V22bis V23

Access: Public

Computer: IBM PC

DOS: MS DOS

BBSSoftware: RemoteAccess

The TurboBBS

Sysop: Tony Salmeri

Phone: (09) 331-1695

Baud: V21 V22 V22bis V23 B103 B212

Access: Reg LVA

Computer: IBM AT Clone

DOS: MS DOS

BBSSoftware: TurboBBS

Tower BBS

Sysop: Lindsay Blume

Phone: (09) 250-1854

FIDOnet: 3:690/634

Baud: V21 V22 V22bis V23

Access: Public

Computer: IBM AT Clone

DOS: MS DOS

BBSSoftware: RemoteAccess

West-Gate BBS

Sysop: Phil van Leen

Phone: (09) 481-0489

FIDOnet: 3:690/640

Baud: V21 V22 V22bis V23 B103 B212 PEP

Access: Reg VA

Computer: IBM AT Clone

DOS: MS DOS

BBSSoftware: Opus

Z-Node 62

Sysop: Lindsay Allen

Phone: (09) 450-0200

Baud: V21 V22 V22bis V23

Access: Public

Computer: BigBoard II

DOS: ZCPR

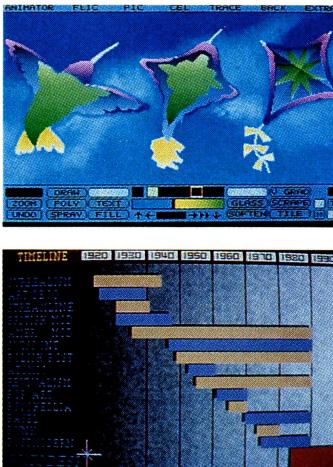
BBSSoftware: Z-MSG

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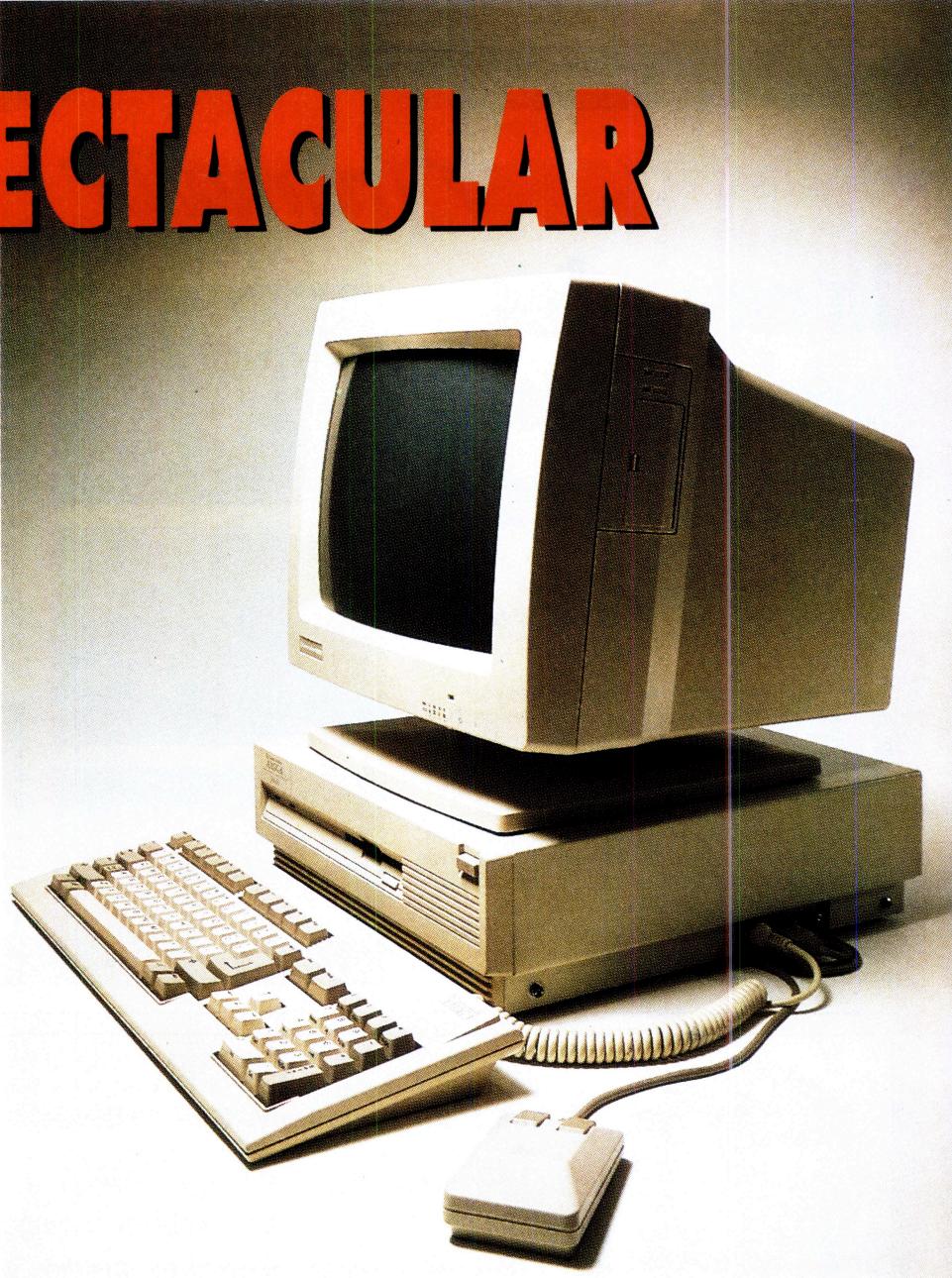
Commodore's assault on the business market has left Gregg Faulkner without a wish list . . .

CONGRATULATIONS to Commodore on the Australian release of the spectacular Amiga 3000. The release of the A3000 confirms the company's commitment to challenge the leaders in the business, higher education and desktop production markets.

Accompanying the Amiga on the release dais were two important software releases: the long awaited Version 2.0 Amiga operating system, and AmigaVision, Commodore's big gun in the presentation manager field. By itself, the A3000 is evolutionary rather than revolutionary. The machine is powered by a 25MHz Motorola 68030 and 68882 maths co-processor which, together with the Enhanced Chip Set of support processors and memory management devices, makes for a very fast Amiga indeed. But, importantly, it remains very much an Amiga, with a very high degree of compatibility with earlier models.

Version 2.0 of the Amiga operating system, like the machine itself, is a major upgrade of the existing system rather than a wholly new product. This is not to denigrate the changes which are far-reaching and very welcome, but again, the relationship to former versions is close.

The final element of the trinity is AmigaVision. This is Commodore's trump card in the Presentation Manager game, and it is brilliant! Object oriented programming has never been so simple and fast, and the results have to be seen (and heard) to be believed. In fact, for me, AmigaVision stole the limelight from the A3000.



Combining AmigaVision, AmigaDos V2.0 and the A3000 into the one package produces an awesome combination of user-friendliness, audio-visual presentation power, and sheer processing grunt, at a price which will have the floors awash in Mac II blood.

What a memory!

THE A3000 MOTHERBOARD is provided with 1Mb of Chip RAM and 1Mb of Fast RAM as standard configuration. Socketed provision is made for an additional 1Mb of Chip RAM and up to 15Mb of extra Fast RAM, giving a possible 2Mb of Chip and 16Mb of Fast RAM on the motherboard.

The expansion slots are Zorro III style, which are downward compatible to the Zorro II slots in older Amiga 2000 and 2500s. One of the slots is carefully aligned with a A2000-style video slot to facilitate combination boards. Two slots are aligned

with AT-style extensions for bridge-board use, though I'm pleased to see that this is the only concession apparent toward Messy-Dos compatibility. Maybe Commodore have finally given up their strange marketing approach of trying to sell Amigas on their capacity for Messy-Dos compatibility.

A 200-pin CPU expansion connector is provided with an eye toward future installation of 68040, 68050 or even RISC processors. All system buses are full 32-bit width, and even the on-board SCSI controller has 32-bit DMA access.

All the Australian A3000s will be equipped with the 25MHz 68030/68882 processor/FPU combination, surface mounted to the motherboard. Overseas, a 16MHz version will also be available, but Commodore Australia's sales team rejected the idea of carrying the 'slow' model here, and rightly so.

Of the original Amiga custom chip set, only Paula remains unchanged. Agnus is now ECS Agnus (grand-daughter of fat Agnus and daughter of obese Agnus) and provides for up to 2Mb of Chip RAM, enabling much larger and more complex image and sound files to be handled.

ECS Denise, the video processing chip, can now handle screens up to 1440 x 612 (PAL) and virtual screens up to 32,000 by 32,000 pixels. Denise is closely associated with Amber, a display enhancer chip, which supports both NTSC and PAL video and can scan double non-interlaced screens or, conversely, de-interlace interlaced screens.

Fat Gary, Fat Buster, Super DMAC and Ramsey, together take care of on-board arbitration – gluing and memory management functions. All in all, the custom chips account for most of the flexibility and compactness of the A3000 design.

The good news for owners of Amiga 2000 and A500 models is that the ECS chips are generally downwardly compatible and can be retro-fitted to existing 500s and 2000s (and, of course, 2500s). The bad news (ain't it always the way?), is that the chips are produced in-house by Commodore and are in desperately short supply – so don't get too excited about upgrading just yet.

Finally, on the topic of hardware anyway, the A3000 comes with the same enhanced keyboard as recent A2000s, and also with the same lousy rotten cheap mouse.

Workbench Version 2.0

OK, SO MUCH for the hardware, but what happens after switch-on? A lot, and most of it happens awfully fast. Version 2.0 of the Amiga operating system is an evolution from v1.3, retaining most of that system's structures. There are also a great number of improvements and totally new facilities which combine to provide a very pleasant, and much more professional looking, working environment.

The first noticeable change is the Workbench window – it's now a window rather than a screen, which means that Workbench can be shut down completely to save every possible scrap of Chip RAM. The next noteworthy item is the additional information provided across the top bar of the re-designed windows. Each device's window shows the total capacity of the device, as well as the capacity used and remaining. Tiny buttons are provided for send-to-back and shrink to minimum size, as well as the close gadget. Fonts used for system messages, window title bars, and

icon labels are now selectable.

Workbench and other window backgrounds can now be set by the user, and no longer are we restricted to plain boring backgrounds. Now, we can have bright criss-cross patterns, paisley type prints and all manner of other exotica (or even erotica, I guess) behind our icons. I found that about five minutes was the limit of my tolerance of such fandangles before I set them back to boring but functional plain panels.

A major change to Workbench is the ability to display window contents as either icons or a list of file names – this is similar to the Mac facility. You can also choose to see only files which have icons or all files. The files can be selected and executed from the names list just as they can from an icon display, which is a very significant improvement over the restricted structure of the previous Workbench.

The general presentation of Workbench is much more business-like than previously, with icons taking on a three-dimensional look and drag bars and buttons appearing to be more solid. Perhaps Commodore's attitude to the new Workbench is best summed up by its choice of business-like and rather severe grey-blue, grey, black and white as the default Workbench screen colors.

The relatively small selection of menu options previously available from Workbench has swollen to include just about every function you could possibly imagine performing from Workbench. You can even choose to Snapshot windows and icons together or separately. Thankfully, it is no longer necessary to select every single icon in a window before performing a group Snapshot.

Producing a new drawer is now a dream because you don't have to go through the tedious process of selecting the Empty drawer, then selecting Duplicate, and then Rename, in order to produce a new drawer. Now, we can simply select New Drawer from a menu. Other improvements to Workbench are many, but less obvious. A screen blanker is now provided, and when the Amiga is not being used, the screen will automatically go dark after a predetermined delay, which helps to preserve the display picture tube.

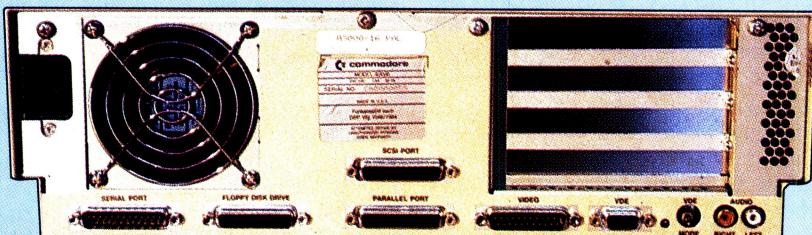
Preferences 2.0

FROM THE INCREASED number of Preferences options, one can now select the type of monitor to be used. Types include the default 1084 type, the new 2024 large screen monochrome beast, and VGA multisync. Either multisync or 2024 is needed to make use of most of the new screen resolutions available with V2.0.



The Amiga 3000 has several new high resolution video modes opening a world of possibilities for desktop presentation and animation.

Good things come . . .



THE A3000 IS built into a case substantially smaller than that of the A2000, occupying a much smaller footprint and not much more than half the height of the earlier machine. The front panel is sculptured with provision for two 3½ inch floppy drives.

Keyboard and mouse/joystick connectors are on the right side of the case, enabling the keyboard to be pushed fully back against the case without risk of damage to cables. The on/off switch is unobtrusively located on the top right of the front panel, which is convenient and quite safe from accidental operations. At the lower left of the front panel are LEDs indicating power and hard disk operation.

The rear of the case presents the first surprise. Along with the usual parallel, serial, disk drive and RGB video connectors, there is a 25-pin SCSI connector and a VGA monitor socket. And, if you're sick of that old interlace flicker, just plug your multisync VGA monitor in right there and enjoy crystal clear high resolution like we've needed a flicker-fixer to see before.

The two new connectors are provided

by an on-board video processor (which does rather more than the old flicker-fixer), and an on-board SCSI controller. The SCSI controller also takes care of the 60Mb drive which is standard equipment on the A3000.

Inside the A3000 is a very presentable motherboard with a remarkable lack of jumpers and patch wiring, suggesting a lot of design and refinement time. A vertical daughter/back plane is used to mount the sockets for up to four expansion cards, which lie horizontally. The power supply is, in keeping with trends, smaller than believable, though capable of more than adequately handling foreseeable loads.

One pleasant change is that it's now possible to install or remove a second floppy drive (or extra 3½ inch hard drive) without having to pull out a mass of hardware and cables. An adaptor plate is fitted to the drive and then a single screw locks the assembly into place, ensuring perfect alignment with the front panel. The standard hard drive is nestled in alongside the power supply out of harms way.

Depending on the type of monitor you select under Preferences, various numbers of screen resolutions will be made available for your selection. With only a default (1084 type) monitor, you can choose from high resolution (640 x 256), super high resolution (1280 x 256), high resolution interlace (640 x 512) and super high resolution interlace (1280 x 512). With a 1084 type monitor, the interlace modes are subject to that bad old interlace flicker.

With a multisync VGA monitor connected, and selected, two additional modes become available. Productivity is a new 640 x 614 non-interlaced mode. Productivity-interlaced provides resolution of 640 x 1218. Even on a (very good quality) multisync VGA monitor, I found the results using it were dodgy. This is a resolution which is most suited to the new Commodore Amiga 2024 monochrome monitor.

Printer options are basically the same

as for V1.3 but the selection windows have been completely re-designed to provide a more efficient and functional-looking display.

If I had written a 'wish list' for Version 2.0 Workbench features, I don't think I would have recorded anything that hasn't been done. The changes all seem to be in the right direction, and I found the new Workbench comfortable right away.

The excellent news for all current Amiga owners is that Version 2.0 will be released in a form suitable for current machines, albeit requiring installation of a new ROM chip (similar to the 1.2 to 1.3 upgrade). Version 2.0 has a number of significant changes, including the ability to format floppy disks under the Fast File-system, introduced in V1.3 for hard disks only.

I have seen an advanced Beta test version of Version 2.0 for the older Amigas and it seems to run very well indeed. Most of the software I tried to run under Version

2.0 on an Amiga 2000 behaved itself, though there were a couple of unpleasant surprises. My favorite utility package, Diskmaster, crashes the Version 2.0 system in a big way which is, to say the very least, somewhat disappointing. But still, I must stress that the copy of V2.0 I tried was a Beta test version, and there will, no doubt, be more changes before it is released.

AmigaVision

JUST WHEN I began to think that I had mastered the intricacies of Director, suddenly I can't see myself using it much. For some time, I have been using Director to create structured presentations which I play during my 'live' training courses or for recording on video tape. I have developed a healthy respect for the capabilities of Director, and it has served me very well for the past couple of years. The problem with Director is that it is text-driven, thus, it must be 'programmed'.

With the A3000 came a Gamma version (without any documentation) of AmigaVision – Commodore's brilliant new presentation manager package. With something like 10 hours of experimentation and exploration behind me, I feel that I know it pretty well already. The amazing thing about it is, the more time I spend with it, the more I like it. I can't believe that after all these years, Commodore has gone and done something so right!

You can easily choose to display a specific image, and while displaying the image, have a brush appear superimposed over the image. While this is happening, a music passage can be played, and digitised sound effects used for highlights. Next, an animation sequence is run, again accompanied by a music piece.

There is much more to the package though. A comprehensive set of control functions is built-in to permit control over the flow of events. Selections can be made, as required, by mouse-click or keyboard input, or flow can be determined by other events such as time or logic switches.

Virtually every capability of the Amiga is supported, from multi-voice sound production and stereo separation to multiple color cycles in image displays. Unlimited brushes can be displayed across images using a large variety of transition effects such as wipes, dissolves and fades. The images themselves can be transitioned on and off the screen in myriad ways.

All graphics modes are fully supported, even overscan (in two levels) and interlace, which makes AmigaVision the

insect's knickers for video production. The control and interactivity functions make it an ideal vehicle for production of computer-based training packages, and in this market alone, it should make a killing.

Construction of a 'script' is done simply by dragging icons from a menu array into cells on a grid chart. Double-clicking on an icon opens a window in which more specific details relating to that icon can be specified. In virtually all cases, everything can be done by mouse selection – you very rarely have to touch the keyboard.

The main icon menu displays the icon groups such as Control, Interrupt, Data, Wait, AV and Module. Let's take the AV menu as indicative of the others. Double-clicking on the AV icon in the Main Menu opens a new menu showing icons labeled Screen, Sound, Speak, Music, Gfx, Brush, Video, Anim and Text. Each of these icons is cleverly (and professionally) drawn to indicate its function. For example, the Screen icon represents a monitor screen, and is used to select a picture for display. Most are self-explanatory, with Gfx being used to control such things as color cycling within a displayed picture. The Brush icon controls display of a brush overlaid on the currently displayed picture.

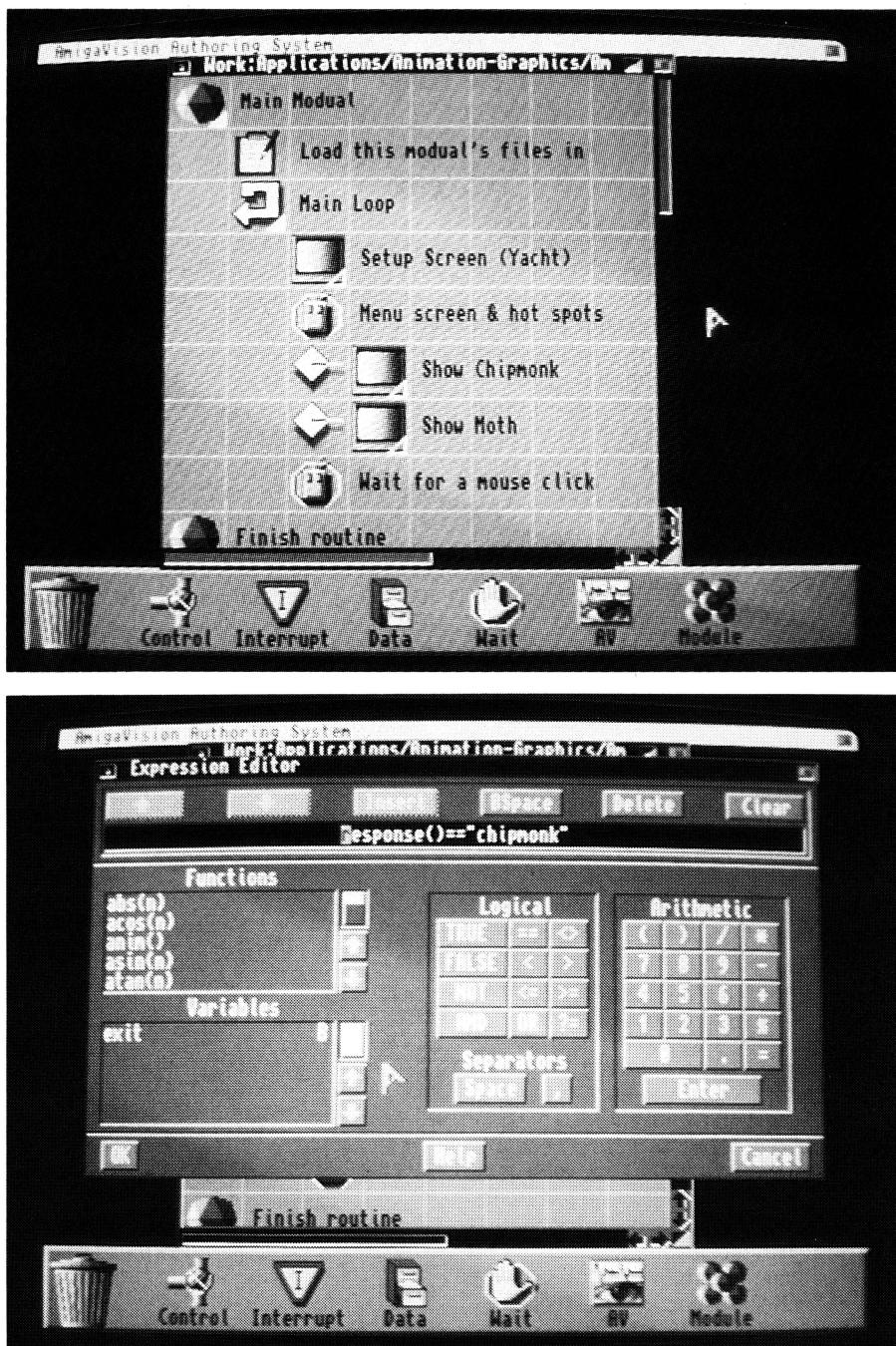
The Video icon is a sign of things to come as it represents a function capable of controlling of a video-disk player, including still-frame, forward and reverse playback at various speeds. Disk indexing can also be accessed to specify the single frame from which the activity will commence. A setup menu provides for selection from a range of different video-disk players, and even a Sony Umatic9 VCR which can be controlled by a serial link.

Going back to the Main Menu, the Wait icon reveals a selection of pause options, from a time delay (represented by a digital watch) to a wait for mouse or keyboard input. Even here, there are options such as 'any key' or 'specific key' to continue the action.

The mouse button selection process can make use of pre-determined 'hot spots' on the screen in order to enable the user to make choices. These choices can then be used to determine the flow of activities. Each selection button can be set to change color and even produce sound when it is pressed (blood-curdling screams have the most interesting effect on people making wrong selections)!

Summary

THE COMMODORE Amiga 3000 signifies a coming of age for the Amiga range. It is



AmigaVision allows you to specify a series of events, the order in which they are to occur, and the timing of the events. The events can be such things as displaying an image, running an animation, playing a digitised sound, generating speech from a text file, playing a Sonix type song, or displaying a text file on-screen.

the first true 'business' Amiga and it could open a lot of doors which have been previously closed to Commodore.

The machine, and its new software, has the potential to make a big dent in Mac II

sales in any field where graphics and presentation is an important criterion. At a price little more than half that of the Mac II, the Amiga 3000 should prove to be a 'nice little earner' for Commodore. □


**JOHN
HEPWORTH**

Communication software packages

WHAT'S YOUR favorite communications software? Mine is Telix, version 3.12. I have reviewed it before, in various versions. All that needs to be said here is that it is powerful, has a simple user interface, and is easy to use by novice or experienced users. The only thing I don't like is making additions and alterations to the dialing directory. While Telix supports multiple dialing directories, with a vast amount of data in them, there is no internal command to sort directories or to import data from other files into a Telix directory. This makes adding multiple entries to a Telix directory a tedious and mistake-ridden job. It's also very risky to use a wordprocessor or text editor to move entries around. Telix dialing directories have a header followed by fixed-length records. If you move one byte too many or too few, all later entries will be scrambled.

To the rescue come two great utility programs. TFE_210 is used to sort, edit and arrange dialing directories. TFON630 reads a data file downloaded from bulletin boards and creates dialing directories.

TFE_210

TELIXFONED (TFE) v2.10 is a most useful program, a full-screen editor for Telix dialing directories. It has much of the power of a wordprocessor, while ensuring that the structure of the dialing directory is not corrupted. If you use Telix, you need TFE to manage and manipulate the dialing directories without pain. It gives you easier, more complete control over the content and arrangement of your Telix version 3.x dialing directories than you can ever get with the internal functions of Telix.

TFE has many functions – sort any part, or all, of a dialing directory on any field, in ascending or descending order; insert and delete entries at random, copy or move a range of entries from one location to another; write part of a directory, or the entire directory, to another .FON file; merge another dialing directory into the one being edited; print selected entries, or all entries, to a file or printer; edit any field in the directory in a simple, intuitive full-screen format; create new FON files from scratch, clean up corrupted FON files,

merge two or more FON files, thus eliminating duplicate entries; and, it can store additional information about any entries in a FON file, such as Sysop Name or Hours of Operation; change the values of an entire group of fields with one command; and search and replace on any part, or all, of a field.

When started, TFE reads a configuration file to determine which screen colors and screen write mode to use, what external protocols are available, and the default modem settings to use. If a configuration file name is specified on the command line, that name is used. Otherwise, TFE looks for TELIX.CNF, the configuration file used by Telix itself. The dialing directory to be edited can be specified on the command line, otherwise, TFE lists all .FON files in the current directory. If no FON files are found in the current directory, it lists all FON files in the Telix directory. To edit one of these, highlight it with the cursor keys and hit Enter.

Now, the main TFE screen appears with several sections. At the top is TFE's copyright information, followed by a line containing the full name of the FON file being edited. The next section is the editing section. Here the entries in your dialing directory are displayed for editing. Each entry has a line to itself, and some fields are hidden to the right of the screen. Tab, or Shift-Tab are used to take the cursor sideways to a different field, cursor keys move sideways within a field and up and down to other fields.

At the bottom of the screen, the available function keys and their effects are listed. Many other functions are run by pressing Alt and another key, and these are briefly listed at the bottom of the screen. Alt-H pops up a help screen that gives a one-line description of each function key or Alt-key combination.

Most tasks, like moving entries, search and replace, and deleting entries can be done on one entry, all entries, or on a

TFE (TelixFonEd) v2.10 Copyright (C) 1988-1990 by Paul Roub, All Rights Reserved						
c:\telix31\all-0690.fon						
Name	Number	Baud	Parity	Data	Stop	
1 QNXUG BBS	(86) 241-1662	2400	N	8	1	
2 Cause BBS	(86) 255-1469	2400	N	8	1	
3 Ghost of Opus	(86) 259-7168	2400	N	8	1	
4 NICSIG Fido	(86) 285-1826	2400	N	8	1	
5 PC Exchange Opus	(86) 259-1486	2400	N	8	1	
6 PCUG Bulletin Board	(86) 259-1244	2400	N	8	1	
7 Percom BBS	(86) 281-3119	1200	N	8	1	
8 The Capital BBS (CUC IACT)	(86) 281-8847	2400	N	8	1	
9 2000 and Beyond AliveBBS	544-7123	2400	N	8	1	
10 588cc Formula One Amiga B	550-6958	2400	N	8	1	
11 A Southern Rendezvous	(842) 26-3382	2400	N	8	1	
12 ABCOM-dataLINK	(847) 36-4165	2400	N	8	1	
13 ACE BBS	664-1363	2400	N	8	1	
14 Aftermath BBS	872-5520	2400	N	8	1	
15 Amiga Connection BBS Club	744-6010	2400	N	8	1	
16 AmigaMan	(847) 58-8886	2400	N	8	1	

Insert

Name of this service

F2 Edit TFE data F3 Delete Duplicates F7 Begin/End Macro F8 Play back Macro
 Alt-keys:
 Add Block Copy Delete Export Find Import Load Move Print Replace Sort Write exit

TelixFonEd (TFE) has many useful functions such as sorting a dialing directory, merging dialing directories, printing selected entries, and searching and replacing any part, or all, of a field.

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range of entries. The user is given the option of moving the cursor to one end of a block, and stretching the block to cover the range of entries. All work fast and well. And, the vast range of sorting options are particularly good. Press Alt-S, and TFE asks if a range of entries, or if all entries, are to be sorted. Entries can be sorted by name, telephone number, baud rate, parity, the script used, the date of the last call, the total number of calls, or around a dozen other characteristics.

Where possible, TFE tries to check the validity of entries. Many fields have no restrictions on the data they may contain – others have a specific range of acceptable values. If the value entered into a field is invalid, either a menu of valid options pops up, or a message appears informing you that the value is invalid.

TFE truly makes it a snap to edit your dialing directory, and rearrange it to meet your needs. It is a product of Paul Roub, PO Box 141583, Coral Gables FL 33114-1583 US.

TFON630

AT THE beginning of each month, the Australian Bulletin Board System Registry puts out an up-to-date list of all known bulletin boards in Australia. It is found on many bulletin boards in a file called BBSFILES.LZH. This in turn contains a number of .LZH files which hold the data in various formats. One of these is BBSAALL.LZH, which has the data in a file called BBSAALL.DAT in what used to be called MailMerge format. This has one line of the file per record, and the individual fields separated by commas.

The traditional way to update a dialing directory was to print out one of the files from BBSFILES.LZH, or view it on-screen, note the details of any interesting boards, and then manually type them into the directory – a recipe for disaster.

TFON630 to the rescue – start it up and it asks which data file it should read, with BBSAALL.DAT as the default. It then asks which Telix dialing directory to create, and suggests TELIX.FON as the default. Next, you are asked for your area code, with (02) for Sydney as the default. TFON630 then asks you for the maximum speed of your modem. The last two questions ask if you want entries from all states, or just from one state, and finally, if you only want entries from your local STD area. It sounds tedious, but really only takes five or 10 seconds to work through.

TFON630 then reads the BBSAALL.DAT file, or a specified data file, and creates a

dialing directory. Processing all entries in Australia takes just a few seconds. It's much faster and more accurate than doing a visual search through a list and manually editing a dialing directory. My only gripe is that the defaults cannot be reconfigured by the user. Living in Sydney, the defaults suit me pretty well, but they may not suit others. In particular, users in other cities would love to be able to set their local STD code as a new default. Hopefully, the author will add this as an enhancement in a future version. But, until then, you can use Dos redirection to get answers to the prompts from a file, thus automating the process and removing the need to answer the prompts.

T3SORTF is a simple program that sorts Telix dialing directories in various ways.

T3SORTF and T3FONFIL

FINALLY, THERE are a couple of interesting files for those using, or manipulating Telix dialing directories. T3FONFIL gives the details of the structure of Telix 3.x dialing directories, and includes them as C structure declarations. It makes writing your own C programs to read Telix directories that much easier. And, T3SORTF is a simple program that sorts Telix dialing directories in various ways. All parameters are entered on the command line, including the name of the input and output files and the way the file is to be sorted. Files can be sorted by BBS name, ascending or descending. They can be sorted by last call date, by 7-digit BBS local number, ascending or descending, or by full BBS number. T3SORTF is unpretentious, but useful, and was written by Robert Hoffmann.

Conclusion

TFE_210 AND TFON630 are vital additions to the software library of anyone who uses TELIX. T3SORTF and T3FONFIL are less vital, but interesting. Look for TELIX 3.12, TFE_210, T3FONFIL, T3SORTF or TFON630 on your favorite bulletin board. Alternatively all five are available for \$10 on one 3 1/2 inch disk or two 5 1/4 inch disks from Salrail, PO Box 102, Haberfield 2045 NSW. Please specify the disk size required and don't forget to register with the authors if usage continues. □

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PETER
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THE IDEA OF making one computer emulate another has been around since the early days of personal computers. Apple owners may well remember the Z80 card that allowed CP/M software to be used on a 64K II+, and for many, this may have been their introduction to programs like dBase and WordStar. These days, CP/M has been replaced by Dos, the domain of the IBM range of computers. Like it or hate it, Dos is everywhere, and a card that turns the IIGS into an IBM compatible computer is an enhancement every owner should know about. The card that does this is the PC Transporter from Applied Engineering, and believe me, it does it very well.

Although the PC Transporter has been around for a while, it is only now that I have been able to get one of these for review purposes. It will also work in a II+ and a IIe, but the IIGS lends itself best of all as the color screen, mouse, and even the keyboard, all work well, giving an IBM XT compatible computer that runs four times faster than the standard IBM XT.

Mind you, unless you are familiar with IBM type computers, you will be entering a world totally unlike the friendly environment of the IIGS. But then, despite its complexity, the IBM standard is very popular, and a knowledge of its operation is almost mandatory out in the 'real world'.

For the home user, having a IIGS that is able to emulate an IBM XT, provides several advantages. For starters, it's likely that one or more members of the family use an IBM at work – and would like to be able to bring some of their work home. Purchasing another complete computer system is hard to justify, and the family doesn't want to see the IIGS sold simply to allow an IBM compatible to be the 'family computer'. With the Transporter card, the best of both worlds can be obtained.

In schools, the local P&C association may be concerned that students are not being exposed to the IBM standard, although they cannot argue the benefit of the Apple for educational purposes. However, with the card, this problem is overcome. Another excellent reason for having

The IBM IIGS!

an IBM system is the availability of software. While Apple software is plentiful, the IBM line-up is truly staggering. As well, there are software applications for the IBM that don't have a counterpart in the Apple II range. As an example, I have never seen Apple II software that can draw circuit diagrams or develop printed circuit boards. The IBM has several, including the popular Protel range. There are other CAD type packages, such as AutoCad, AutoSketch and so on, that simply don't have an equivalent for the Apple II series, although these types of programs are available on the Macintosh. Similarly, there are IIGS programs that are outside the capabilities of even the more expensive IBM computers. Have you ever tried to make music on an IBM? OK, it's possible, but it still doesn't match the sound from a IIGS.

*I have never seen
Apple II software
that can draw circuit
diagrams or develop
printed circuit boards.*

The PC Transporter card *really* is the ideal solution, and after having spent time with it, I'm very impressed. And, in case you think I'm easily impressed, I spend 25 hours a day in front of a range of IBM compatibles, including my own 386SX with its 80Mb voice-coil hard drive, VGA screen and every conceivable extra. My true love is the IIGS, but it cannot fulfill all my work requirements. But, would a Transporter card allow me to flog off the 386SX? Probably, that's how good it is. Unfortunately, a lot of the software I need is specific to an AT compatible, and as the Transporter only emulates an XT, I suppose I'm locked in to retaining both systems. However, if Applied Engineering produce a card that converts the IIGS to an AT, and if it works as well as the PC Transporter, then watch

for my 'for sale – slightly used 386SX' advertisement!

Installing PC Transporter

THE TRANSPORTER card comes in two packages: the card itself plus a huge installation manual and related software, and an adapter kit (color switch) complete with a 22 minute video. However, unless you have an NTSC system, all you will get is the soundtrack, which is hardly discernible anyway. So, forget the video and start with the manual. Obviously, any mistakes in the installation of the hardware can kill either the Transporter card or the IIGS, so read the manual carefully.

Although the installation procedure seems complex, it is really very simple. Basically, the installation requires the color switch card to be connected to the Transporter card with a 10-wire cable, and connected via the supplied Molex-DB15 cable to the IIGS video outlet. The IIGS monitor then plugs into the color switch card which mounts on the IIGS backplane, next to the power supply, secure it with the hex jack screw, holding the top of the connector and a screw on the bottom of the mounting flange on the card. It's a bit fiddly, but it all fits in. The DB15 plug from the color switch card plugs into the IIGS video output socket, which is just below the card. I found I had to remove the clips holding the screws on the plug and then reinsert the screws without the clips as the screws were not quite long enough to mate with the hex jacks.

The Transporter card plugs into any available slot (not slot 3) and at least one disk drive is driven by the card. An Apple 3½ inch disk drive (or an Applied Engineering TransDrive) can be used, and up to four drives can be daisy chained (two TransDrives plus two Apple drives). After you've done it once, installation will only take 10 to 15 minutes, and the manual describes the process reasonably well.

Running the card

TO ACTUALLY GET the card going is not as easy as the installation, so I'll describe how I did it, as the manual is a bit confusing on this topic. I installed the Transporter card in slot 5 and then told the IIGS

control panel that this slot was 'my card'. I chose this particular slot because I connected my one and only 3½ inch drive to the card, making the Smart Port (at slot 5) redundant. Then I set the system to boot from slot 6, which had a single 5¼ inch drive connected via a disk driver card left over from my II+. By inserting a copy of the supplied disk titled /AEPC.UTIL Startup and Utilities, and rebooting, things started to happen. Because this disk is double-sided, I had to turn it over half way.

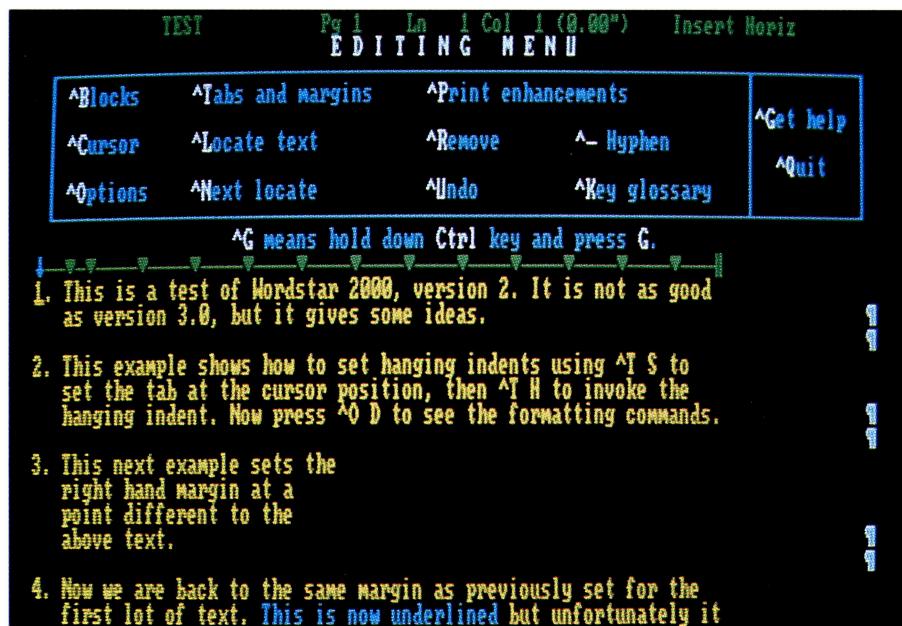
The message 'disk error' then appeared, after which I followed the instructions in the manual to make the card recognise the 3½ inch Apple disk drive connected to it. The new configuration was saved to the disk, after which I rebooted the card from the 5¼ inch drive, then got into IBM Dos via an IBM Dos 3.3 disk in the 3½ inch drive.

However, although I now had an IBM XT staring at me from the IIGS screen, the boot up procedure was too involved for my taste. Instead, I wanted to be able to use my hard disk (CMS 20Mb disk with a CMS SCSI interface) to do everything. After following the fairly detailed instructions in the manual, I eventually achieved a set-up in which the software to run the card and the IBM Dos files all resided on the hard disk. As well, I allocated space for more IBM software on the hard disk, and ended up with an XT compatible that had a 3½ inch disk and a section of my hard disk, as well as a IIGS system also able to use the hard disk and that's the 5¼ inch drive. If ever I wanted to use the single 3½ inch drive for IIGS software, I would need to plug it into the Smart Port (slot 5) and change the control panel settings.

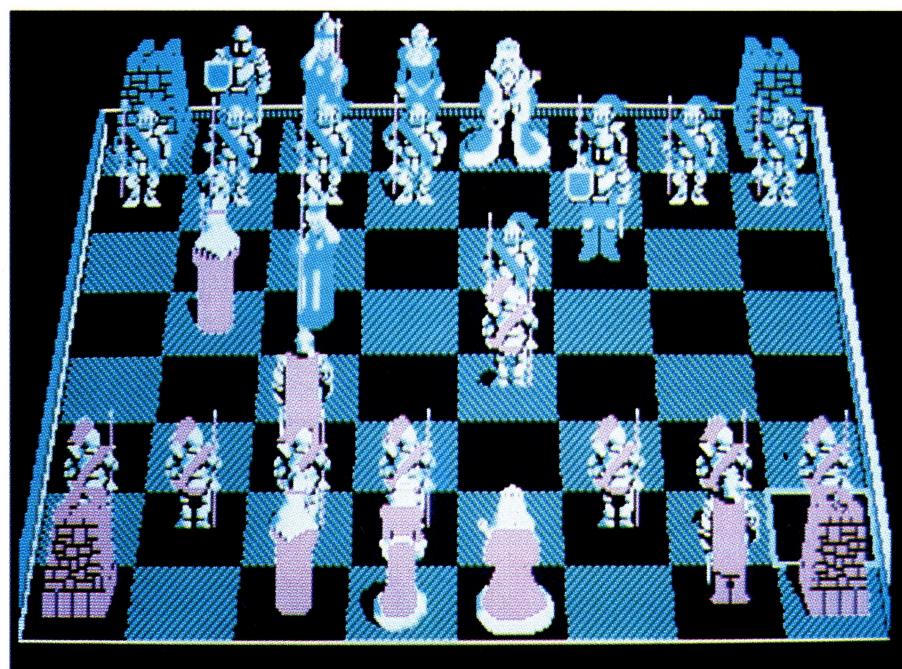
This was the only messy aspect to an otherwise perfect arrangement. If I was truly serious, another 3½ inch disk drive would be the way around all this. For those without a hard disk, a 3½ inch disk can be configured as a 'hard drive' to give a set-up such as I've just described.

Using the card

THE THING THAT impressed me most of all was the ability of the system to easily switch between being a IIGS or an IBM XT. From the IIGS Finder, all that's required is to double-click on the icon called Star-taepc, located in a folder on the hard disk. After less than 30 seconds, up comes the familiar C prompt (on my system) waiting for further instructions. To exit back to the Finder requires the Shift key to be held down while the Caps Lock key is pressed



Imagine WordStar 2000 on a IIGS! Once the PC Transporter card is installed, documents can be easily exchanged by swapping disks between the IIGS running in XT mode and any other IBM compatible.



Battle Chess has been written for most computers, including the IIGS. This is how the IBM version appears on a IIGS running on the PC Transporter card.

twice. This brings up a menu with the option 'exit to ProDos', which puts you quickly back to the Finder, thereafter you can run a IIGS program – it's that simple!

I tried quite a few IBM applications, including WordStar 2000 version 2, a few games, XTree Pro and others. They all ran quickly, in full color and exactly as they

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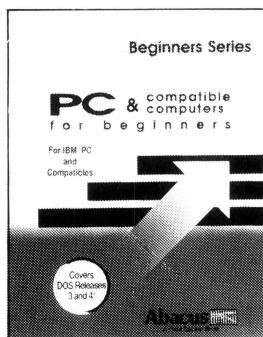
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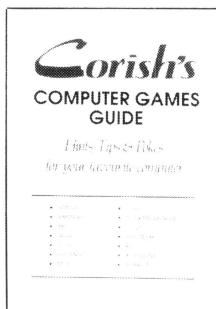
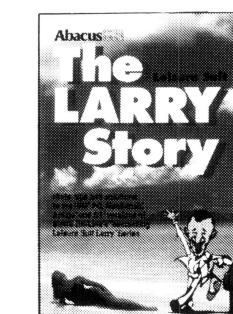
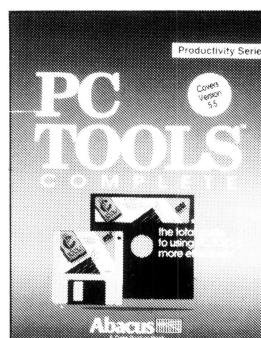
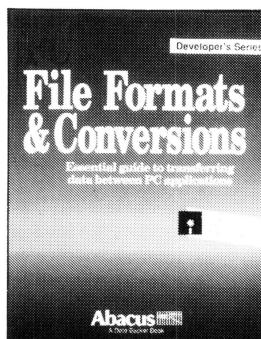
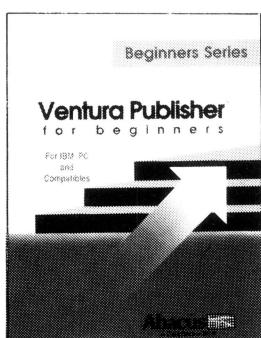
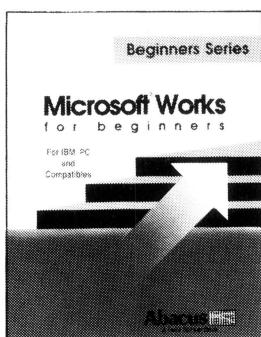
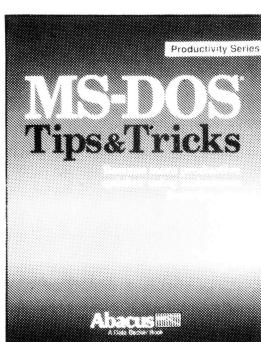
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would on an IBM XT, except faster and with better resolution than a CGA monitor. Naturally, those who have no familiarity with the IBM system will come up against things like the config.sys and autoexec.bat requirements, but this is only a matter of research. And, once the system is set up, it's simply a question of learning the software. There are no peculiarities with the card, no special 'things to know', and those experienced with the Dos world will quickly get going. The few limitations are clearly described in the manual, such as the need to use any Basic language other than that written by IBM. However, this also applies to most IBM compatibles as well.

Extra features

THE CARD COMES with 768K of RAM, of which 640K is useful in a Dos application. However, according to the manual, all of this RAM can be used by the IIGS as a RAM disk, and there are special drivers supplied with the card to make the extra RAM available to AppleWorks. To be quite honest, I was unable to access the RAM disk feature.

*My true love is the IIGS,
but it cannot fulfill all
my work requirements.*

A PC compatible keyboard can be connected to the card which gives you the rather awkward situation of two keyboards. However, I found the IIGS keyboard quite suitable, and I soon got used to pressing the option key and a number key to invoke the function keys that are an integral part of a PC keyboard. The IIGS keyboard is described in the manual as being particularly suited to the application of emulating a PC keyboard, so purchasing another is not really necessary.

There are heaps of other features, such as the card's ability to recognise a range of Apple interface cards. For the IIGS, the automatic configuring process sets up drivers to recognise the mouse and the two serial ports. The card can also drive a CGA type monitor, such as those used

with an IBM XT, but the IIGS color monitor is better. Also, a maths co-processor can be added if required.

My only complaints are about the manual and the fact that a Dos 3.3 system disk is not supplied, although admittedly this disk is not hard to get. One problem I found was that a 3½ inch disk formatted to 720K on an IBM type 1.4Mb drive could not be read by the Apple 3½ inch drive and I suspect there will be other similar incompatibilities.

In summary, I have yet to learn the full capabilities of the PC Transporter, but it performs its basic task of emulating an IBM XT very nicely. It will take some time before I really have everything organised, but the fact that I was running WordStar 2000 on my IIGS after only a few hours of installing, reading and configuring, is testimony to its basic ease of use.

The card was supplied for review by Two Series Software, PO Box 1, West Hoxton 2171 NSW, (02) 606 9343, and is available for \$720, including tax. This company also stocks a large range of IIGS and IIe software and hardware and is well worth contacting for that hard to get item. □

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**A monthly treatise by PC expert Vern V. Shrunkle, M.D. (Honorary)
B.A (failed, Madras), Ex Training Manager -- K-Mart Checkout School,
Holder of "Geoffrey Davis Perpetual Scone Baking Trophy"**

PCs for Blokes

This discourse is extremely interesting, and may not be used in the privvy. Whilst all characters are real, the stories are fictional and any resemblance to any story, living or dead is pure co-incidence.

No advertising material and NO StatusGraph brochures please.

(Re-told and illustrated by Foote and Mowth)

Greetings fellow technology types. Spring is in the air and Old uncle Vern's imagination juices have begun to flow once again. The air is full of the scent that tells of nature in bloom — two-stroke mower smoke. I just love it, don't you?

This month's little tale is about how I did my bit to rid our neighbourhood of crime. It all started just a year ago, on a day not unlike this one

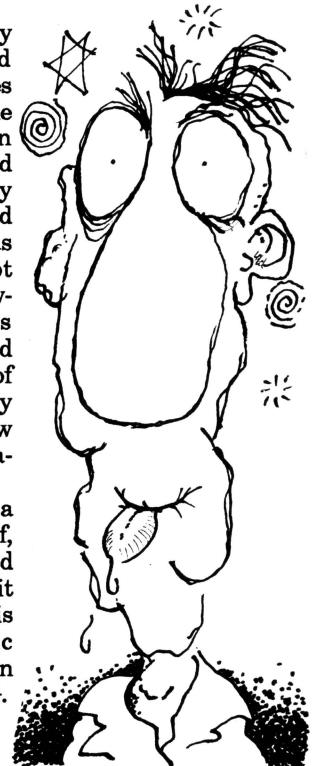


Neighbourhood Watch patrol #2833, Chalky Brown, Stretchy Harris and I were doing our daily rounds of the neighbourhood, looking for suspicious activities, checking everyone's cars for under-inflated tyres, de-sexing any cats we found, and so on.



Suddenly Stretchy stood stock still, his eyes glazed over and he began to talk in dBaseII. This had happened many times before, and we knew that as long as we kept him from swallowing someone's tongue he would soon snap out of it, and probably have written a new computer application to boot.

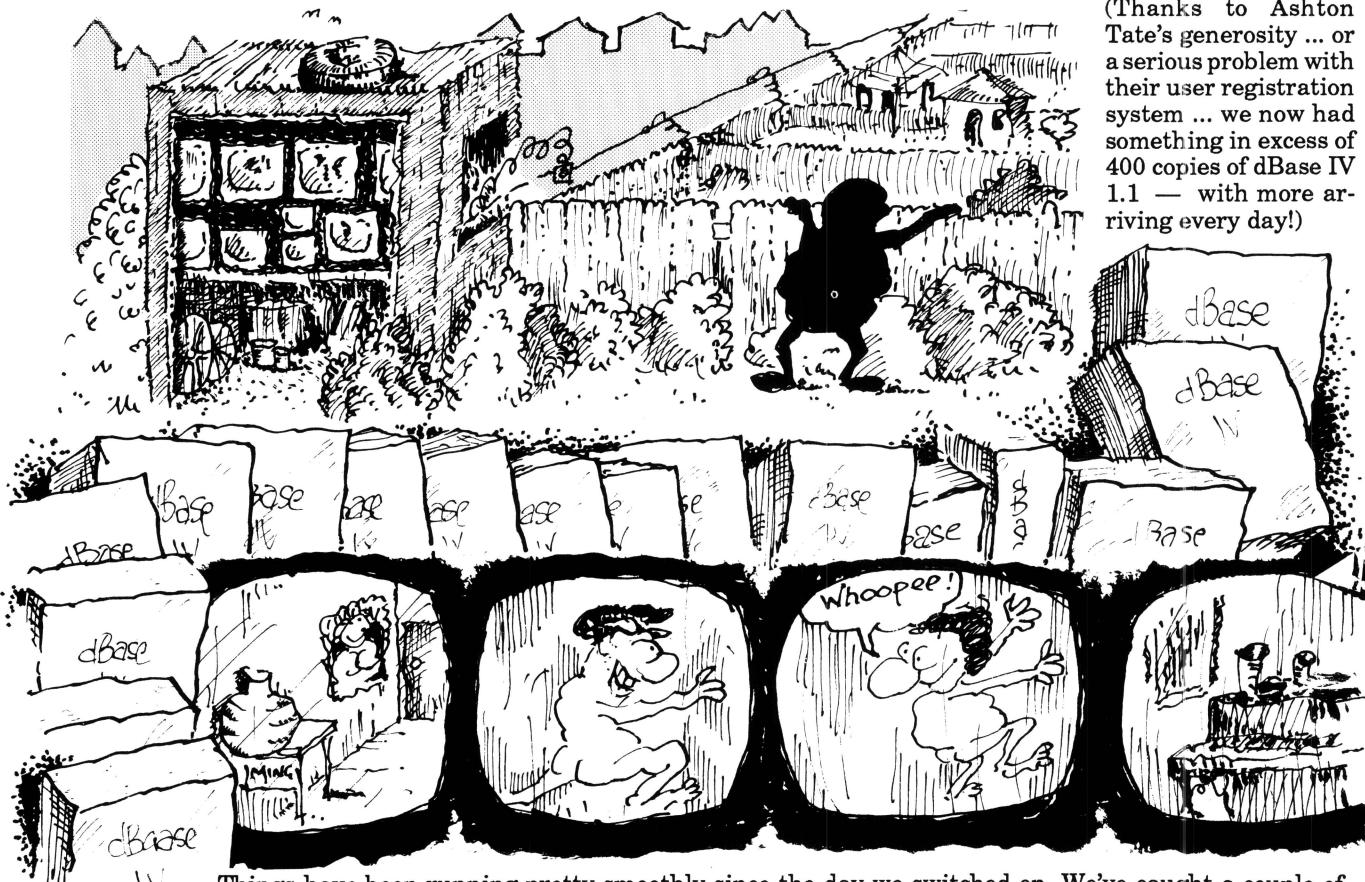
Well, to cut a short story in half, we did and he did and he had and it was the Harris Mk.I Domestic Observation Gizmo — or DOG.



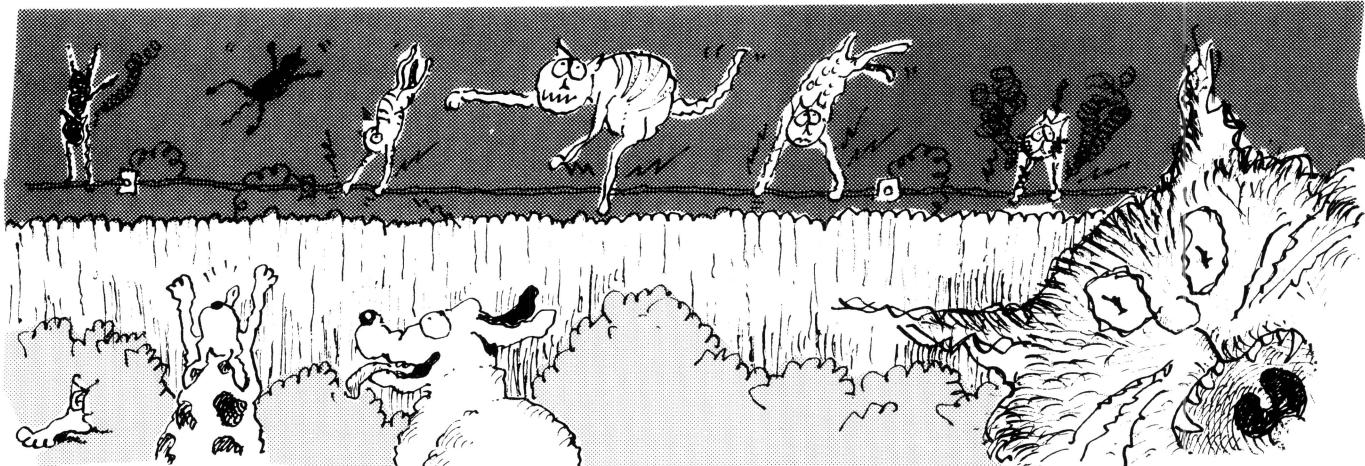
Our biggest problem was how to connect everyone's burglar alarms to the network, when we realised that there was a galvanised straining-wire running along the top of everyone's back fence — just the thing for our DOG. So Chalky invented a multiplexer/encoder module based on two dead AA batteries,

4 square inches of Alfoil and a KMart "dollar days" brochure soaked in beer. It allowed each burglar alarm in sequence to report its status via the straining wire, to the trusty President, and then onto the bank of TV screens in operation central (also known as our potting shed)!

The next couple of weeks were rather full. First we made sure everyone had burglar alarms fitted to their homes. Then Chalky punched the code into the old President PC. (Thanks to Ashton Tate's generosity ... or a serious problem with their user registration system ... we now had something in excess of 400 copies of dBase IV 1.1 — with more arriving every day!)



Things have been running pretty smoothly since the day we switched on. We've caught a couple of burglars, scared the hell out of Mrs Snodgrass and the Milkman down at number 44, and generally kept the neighbourhood in check.



There has been a slight change in our routine, though — we haven't been bothered much by the local cats of late. You see, they all used to sit on the fence that runs between Gumnut Drive and the park every night and serenade each other. I say "used to" because Barry Brabham heard about our scheme and decided he'd

connect his workshop equipment onto our fencetop network. Everything went fine until he connected his emergency mains generator. Some of those cats ended up a full three blocks from that fence — most completely hairless, and not one has been seen in the neighbourhood since. Funny thing is, the President has never worked better!

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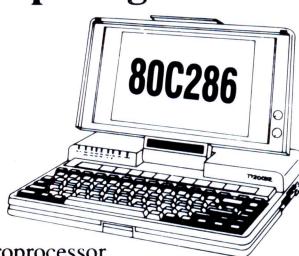
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To Unix or not?

I have a legal practice currently running six networked '286s and '386s, with a dedicated file server. The system can get heavily overloaded at times, and is getting a bit old anyway. (It seems to me that for data security reasons, it might be an idea to replace hard disks, floppy drives and so on before we *do* have trouble. Even though we are religious in our back-ups, I'd rather not have a system out of action for any length of time.) I read your Unix feature in the July issue and IBM's System/6000 sounds like it was made to order, but a quick calculation showed I'd be looking at a \$100,000 system, plus software. Unix seems to be the current favorite of the 'gurus' – is this the way to go?

John Brown

North Sydney, NSW

... it depends. If you don't expect to add more workstations to your office, the short answer is no. Currently, Unix systems do not generally become cost-effective until there are a minimum of six to eight users, and networked PCs can still hold their own (depending on the application mix) up to 15 or more users. Bear in mind, too, that you have one helluva investment in hardware and software skills in the office – if you change to a Unix system, it's going to take some months before productivity reaches the current level again. Space forces me to be simplistic (I certainly advise you to discuss it with 'experts' before deciding one way or the other), but I would suggest upgrading the server and the individual workstations as re-

quired. You should also look at the software being used: there may be more efficient ways of handling the various tasks. For businesses like yours that have already made a commitment to a system which is working well, except that it lacks 'power', it wouldn't be wise to change OSs in mid-stream.

Presentation graphics

The feature on Presentation Graphics in the July issue of *Your Computer* was interesting, but I need to point out an inaccuracy. The article suggested that Pixie is distributed by Technical Imports Australia; Pixie is distributed by Dimension Graphics and sub-distributed to dealers by Technical Imports. Also, only one film recorder was mentioned.

Dianne Gale

Dimension Graphics, Sydney

First, let me apologise to Dimension Graphics and our readers for the 'mis-information'. Second – given the space limitation's of a magazine format, we are always left in the awkward position of determining which products to mention in our features. As editorial policy, we don't compile and publish big tables of products – I have yet to see one that was totally accurate, and question their usefulness to serious 'shoppers'. Of course, another problem is that in mentioning a product, we appear to recommend it. That is not the case at all – we offer them as examples of current products, features and price (and are very careful to state that); this information can then be used for comparison. We have no intention of making anyone's purchasing decision for them – it's a choice that can only be made by someone who knows a business' specific problems. □

Write Bytes, Your Computer, PO Box 227, Waterloo 2017 NSW.

Worth a legal copy!

I have a pirated version of a wordprocessor that I have been using for some time now. It's called Select Write and is perhaps the simplest, most accessible and self-contained wordprocessor I have ever used. I would like to obtain a current legal copy (mine is dated 1983), but there are no clues to the distributor or developer in the software. The name on the opening screen – Select Information Systems Inc. – sounds American. Can YC help?

J. David Edwards
Cairns, Qld.

It must be a good package: you are the second pirated-copy user to ask about Select Write in the past 12 months. We checked Australian, English and US sources for reference to it over the past two years and were unable to find the name listed as either a product or a company. Since the name sounds so American, I suggest you contact the US Consul-General here in Sydney, which keeps a register of US business names, trademarks and registered brand names. The number is (02)

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